ATTACHMENT-1

BARNHARDT
MANUFACTURING COMPANY
247 Main Road PO Box 3 • Colrain, MA 01340 • (413) 624-3471 • Fax (413) 624-5590

June 2, 2020

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square – Suite 100 (OEP06-03)
Boston, MA 02109-3912

Submitted Electronically to: R1NPDES.Notices.OEP@epa.gov

Re: **Revised 2018 Discharge Monitoring Report**
Barnhardt Manufacturing Co.
247 Main Road
Colrain, MA

To Whom it May Concern:

Barnhardt Manufacturing Company (BMC), is providing this cover letter in response to the United States Environmental Protection Agency's (USEPA) May 13, 2020 "Request for Information Pursuant to Section 308 of the Clean Water Act and Section 114(a)(1) of the Clean Air Act, EPA Docket No. CWA-308-R01-FY20-60."

USEPA's records indicate that BMC was not in compliance with the following reporting requirements under National Pollutant Discharge Elimination System (NPDES) Permit No. MA0003697 Parts I.B and I.C.:

- The December 2018 Discharge Monitoring Report (DMR) did not include the Nitrogen Removal Optimization Annual Report for 2018, due on January 15, 2019; and
- The December 2018 DMR did not include the Compliance Schedule Annual Report for 2018 due on January 15, 2019, nor was it submitted to the NPDES Applications Coordinator.

BMC has amended and submitted a revised December 2018 DMR to include the 2018 Nitrogen Removal Optimization report and 2018 Annual Compliance Report. A copy of the 2018 Nitrogen Removal Optimization Report, the 2018 Annual Compliance Report and revised December 2018 DMR are included as attachments to this letter and are hereby submitted to the EPA/OEP NPDES Applications Coordinator in the EPA Office Ecosystem Protection (OEP) in accordance with I.C.3 of the NPDES Permit.

All future reporting requirements shall be submitted using NetDMR and/or directly to the NPDES Applications Coordinator in accordance with the requirements set forth under the Permit.

If you have any questions or concerns, please don't hesitate to contact the undersigned.

Tim Mosher
Environmental, Health and Safety Manager
Barnhardt Manufacturing Company

Cc: Tom Robinson, Barnhardt Manufacturing Company, 1100 Hawthorne Ln, Charlotte, NC 28205

2018 NITROGEN REMOVAL OPTIMIZATION

Applied Technology and Engineering, P.C.

545 Panorama Road
Earlysville, VA 22936

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February 28, 2019

Mr. Tom Robinson
Director of Operations and Product Development
Barnhardt Manufacturing
1100 Hawthorne Lane
Charlotte, NC 28205

Delivered by EMAIL

Ref: Gris WWTP Nitrogen Removal Optimization

Dear Tom:

Please find attached my report regarding opportunities for operational changes that can be made to reduce the total nitrogen content in the effluent from the Gris Wastewater Treatment Plant located in Colrain, MA. This evaluation was required under the discharge permit MA003697 for discharge into the North River.

As explained in the report, the existing wastewater treatment system is being operating efficiently and no operational changes that would significantly reduce the concentration of effluent total nitrogen were identified. Attempts to establish anoxic conditions within the existing treatment system without proper mixing and control may compromise the treatment system efficiency with respect to both carbonaceous material removal and nitrification. To provide additional total nitrogen removal, significant capital expenditures would be required for denitrification.

Feel free to contact me if you have any questions or need additional information.

Sincerely,

W. Gilbert O'Neal

W. Gilbert O'Neal, Ph.D., P.E.
President

Cc: Greg Morand, Omni Environmental Group
Mark Thibodeau, Barnhardt Mfg.
Rebecca Israel, Barnhardt Mfg.
Susan King, MassDEP
USEPA, EPA/OEP NPDES Applications Coordinator
Keith Gammell, Barnhardt Mfg.
Larry Couch, Barnhardt Mfg.
Lewis Barnhardt, Barnhardt Mfg.
Kimberly Groff, MassDEP

Treatment Plant Optimization for Nitrogen Evaluation

Barnhardt Manufacturing Company
Colrain, MA

Prepared by:
Applied Technology and Engineering, PC.
W. Gilbert O'Neal, Ph.D., P.E.

February 28, 2019

Background

Barnhardt Manufacturing operates a cotton bleaching plant located at 247 Main Road, Colrain, MA, 01240. Wastewaters discharged from the facility and from the Village of Griswoldville are treated at Barnhardt's wastewater treatment plant (WWTP) using extended aeration biological treatment. The WWTP operates in accordance with the NPDES Permit No. MA003697 and discharges to the North River. Wastewater from the bleaching operation has a relatively high concentration of nitrogen with an annual average total nitrogen load to the receiving stream estimated to be 67.3 lbs/day.

The reissued permit, dated 3/1/18, requires that an evaluation be performed of the alternative methods of operating the existing WWTP to optimize the removal of nitrogen, and to submit a report to EPA and MassDEP documenting the evaluation. Recommended operational changes are required to be implemented in order to maintain the existing mass discharge loading of total nitrogen, which will be measured as an annual average. The report is to also include documentation of the annual nitrogen discharge load from the facility and how that load compares to previous years. This report is intended to address these requirements.

Description of the Existing WWTP

A flow schematic of the WWTP is provided in Appendix A. The WWTP was designed for a capacity of 1.3 million gallons per day (mgd). Wastewater from the Gris Plant, including bleaching, sanitary and other wastewaters, and wastewater from the Village of Griswoldville are combined and pumped through screens to remove fiber and other coarse solids. Screened wastewater flows to the extended aeration activated sludge plant which consists of two aeration basins and two secondary clarifiers. Each aeration basin provides a hydraulic capacity of around 1.65 million gallons (MG) and can be operated independently. Fine bubble diffusers are provided for aeration and mixing. Each clarifier has a diameter of 55 feet and can be operated in parallel or individually. Clarifier effluent flows are combined and pass through a metering station to the discharge point. A belt filter press is used for sludge dewatering.

Current Operating Performance

A summary of selected operating parameters is shown in Table I for the calendar year 2018. Flows and loadings to the WWTP are well below the design criteria with the effluent flow averaging only 0.323 mgd compared to the 1.3 mgd design flow. With respect to the biological system performance for carbonaceous materials, the average Chemical Oxygen Demand (COD) and Five-day Biochemical Oxygen Demand (BOD_5) concentrations are reduced by 87% and 99%, respectively. This represents a high level of treatment efficiency. Effluent TSS concentrations are well within permit limits averaging 24 mg/L. For nitrogenous materials, the total nitrogen percent removal was 39%. However, 74% of the Total Kjeldahl Nitrogen (TKN) was removed. The relatively high total nitrogen remaining is due to nitrification and an increase in nitrite and nitrates which represent 62% of the final effluent.

The concentrations of nitrogen compounds from influent sources and the final effluent are shown in Figure 1. The mass contributions are shown in Figure 2. Over 89% of the total nitrogen loading originates from the bleaching area. While the nitrogen concentrations from the Village are high, the flow is low contributing only 1% of the total influent nitrogen loading.

The composition of the influent and effluent nitrogen as a percentage of the respective totals is shown in Table 2 and Figure 3. The total influent nitrogen concentrations average 119 mg/L in 2018. The influent nitrogen was primarily present as organic nitrogen with an average concentration of 29 mg/L representing 81% of the total. Influent ammonia concentrations were relatively low with a concentration of 3.9 mg/L representing 11% of the total. Nitrite and Nitrate (NOx) concentrations averaged less than 1 mg/L representing only 3% of the influent total nitrogen.

The total nitrogen concentration was reduced by only 39% across the WWTP with an effluent concentration of 72.9 mg/L. However, TKN (ammonia plus organic nitrogen) was reduced by 74%. Ammonia and organic species that degrade to ammonia were nitrified with the effluent NOx concentration increasing to an average of 14.5 mg/L. NOx represented 62% of the final effluent total nitrogen.

Table I. Summary of Selected WWTP Operating Parameters

		Influent		Bleaching		Village		Effluent	
Parameter	Units	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Flow	mgd			0.182	0.407	0.005		0.323	0.757
COD	mg/L	1349	2480	2061	3350	234	978	176	334
BOD	mg/L	432	1200	523	1200	84	180	6	30
TSS	mg/L	28	88	30	80	99	960	24	119
NOx-N	mg/L	0.9	1.5	0.9	1.5	0.1	0.5	14.5	38.7
NH3-N	mg/L	3.9	12.1	5.8	9.1	20.6	46.2	0.9	6.3
TKN	mg/L	33.8	82.9	41.5	70.8	33.8	111	8.7	16.5
Org-N	mg/L	29	70.8	35.7	61.7	13.1	67.2	7.7	14.6
Total-N	mg/L	36	83.7	41.2	64.3	33	111.5	23.4	54.9
Total-N	lbs/d	119	262	106	172.3	1.4	4.6	72.9	202.3

Figure 1. Nitrogen Concentrations for Influent Sources and Final Effluent

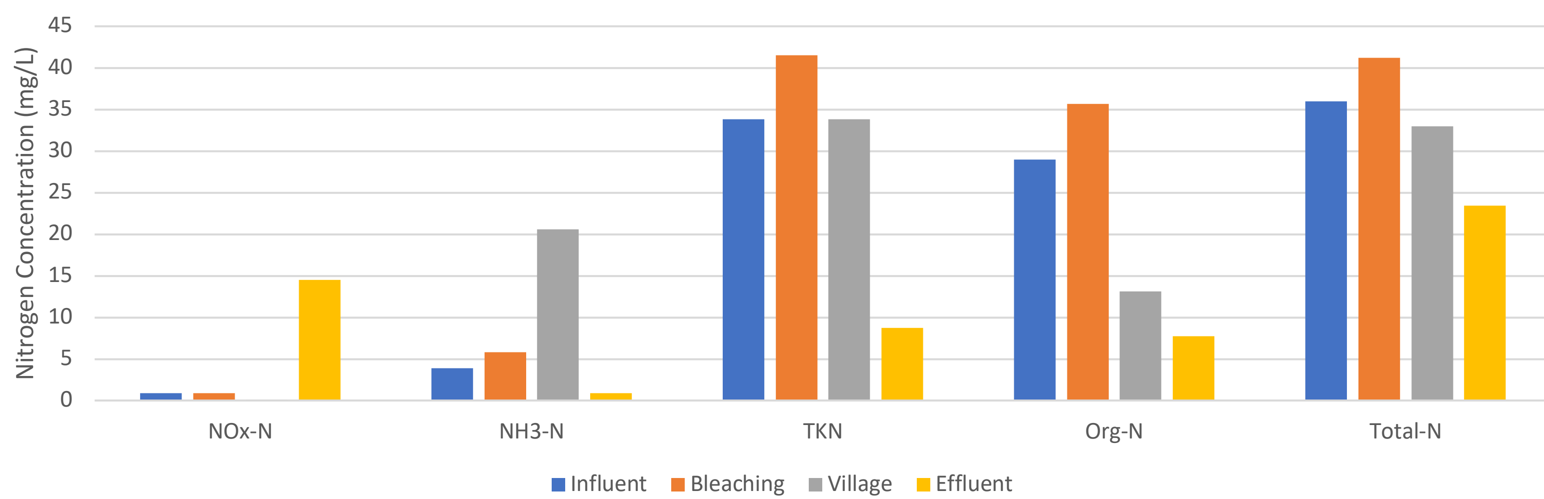


Figure 2. Total Nitrogen Influent and Effluent Loadings

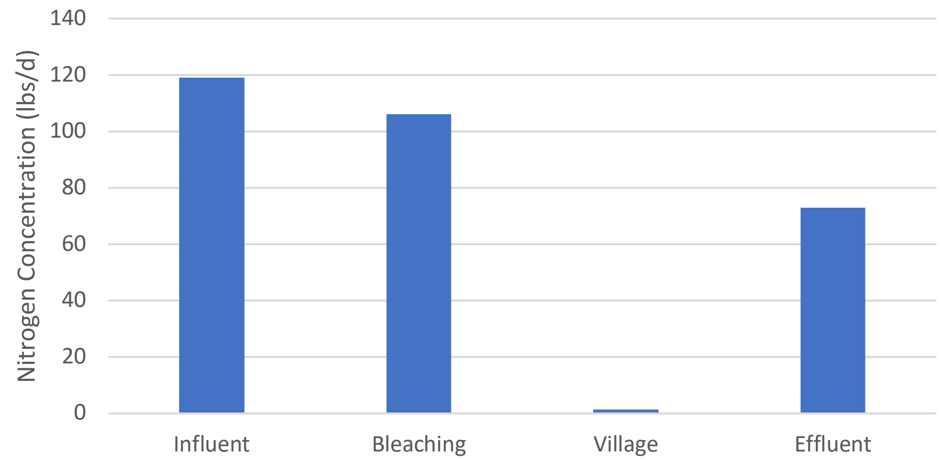
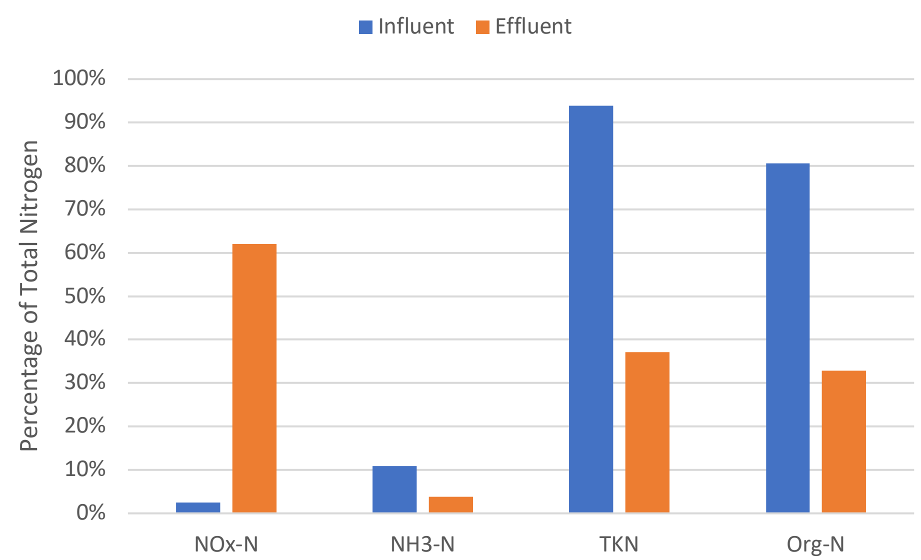


Table 2: Percent Composition of Nitrogen Species for Influent and Effluent

	Influent	Effluent
NOx-N	3%	62%
NH3-N	11%	4%
TKN	94%	37%
Org-N	81%	33%

Figure 3. Nitrogen Composition



Evaluation of Operating Methods to Optimize Nitrogen Removal

As discussed above, the WWTP is operating at a high level of efficiency with respect to removal of carbonaceous materials. While the removal efficiency of 39% for total nitrogen may appear to be low, it should be noted that the TKN representing ammonia and organic nitrogen compounds was reduced by 74%. Sixty-two percent (62%) of the effluent total nitrogen consisted of oxidized forms of nitrogen, namely nitrite and nitrate. The existing wastewater treatment plant was designed to operate under aerobic conditions with a high hydraulic retention time (HRT) and high mean cell residence time (SRT). Under these design conditions, nitrification, the conversion of ammonia to nitrate, is expected and is occurring. To reduce the effluent NOx concentration and thus the total nitrogen concentration, operating under anoxic conditions to promote denitrification would be required.

Denitrification can be accomplished by establishing anoxic conditions for the mixed liquor suspended solids (MLSS) to promote the use of nitrate for the oxidation of organics rather than oxygen.

During denitrification, nitrate is converted to nitrogen gas by heterotrophic bacteria. This is accomplished in an anoxic zone in which there are low oxygen conditions with dissolved oxygen concentrations less than 0.2 mg/L. This process is represented by the following simplified reaction:

$$NO_3 + \text{Organics} \rightarrow N_2(\text{gas}) + CO_2 + H_2O + OH + \text{New Cells}$$

The anoxic zone must be completely mixed to maintain MLSS suspension and uniform conditions for both soluble and suspended materials. In addition, an organic substrate must be present. In some cases, where the concentration of soluble biodegradable organics is low, a supplemental substrate, such as methanol or acetate, must be added. In other cases where relatively low concentrations of NOx must be removed, endogenous respiration, or cell decay, may provide sufficient substrate for nitrate reduction.

Denitrification can be provided using pre-anoxic, post-anoxic, or combined aerobic/anoxic processes. During pre-anoxic treatment, influent is combined with the MLSS prior to aerobic treatment. The organics in the influent may provide sufficient substrate for denitrification to occur. However, in some cases, a supplemental feed source is required. Return sludge is mixed with the influent in the pre-anoxic tank (or segregated zone). In addition, to enhance nitrate removal, MLSS is recirculated from the aeration basin to the pre-anoxic tank. Recirculation rates up to 4 times the effluent flow rate are often used. No aeration is provided to the pre-anoxic tank and mixing must be provided.

Post-anoxic treatment is used by passing the MLSS through an anoxic tank (or zone) following aerobic treatment. Since this process follows aerobic treatment, limited organic substrate is available. In some cases, sufficient endogenous respiration occurs to allow limited denitrification. However, it is common to provide an organic supplemental feed source to improve nitrate removal. Again, no aeration is provided to the post-anoxic tank and mixing must be provided.

Denitrification has also been accomplished in combined aerobic and anoxic systems. This can be accomplished in sequencing batch reactors, oxidation ditches and completely mixed systems which are designed to expose the MLSS to cyclical aerobic and anoxic conditions. In completely mixed systems, dissolved oxygen and/or oxidation reduction potential (ORP) controls are provided to alternate the MLSS between aerobic and anoxic conditions. Mixing must be provided at all times during this process.

While sufficient volume is provided to establish anoxic conditions at the Gris WWTP, the EXISTING facilities do not provide sufficient mixing to maintain MLSS suspension without use of the diffused aeration system. In cases where high oxygen uptake rates are experience in the aeration basin, low airflow rates have been used to maintain mixing under anoxic conditions. However, the fine bubble diffusers installed in the WWTP aeration basins do not provide sufficient mixing under low airflow conditions. Even under normal aeration conditions, settling of solids can be observed in different areas of the aeration basins. Further, equipment for controlling blower speed and dissolved oxygen are not available. To provide anoxic treatment, additional equipment such as mixers, recirculation pumps for pre-anoxic treatment, chemical feed equipment for post-anoxic treatment and control systems will be required.

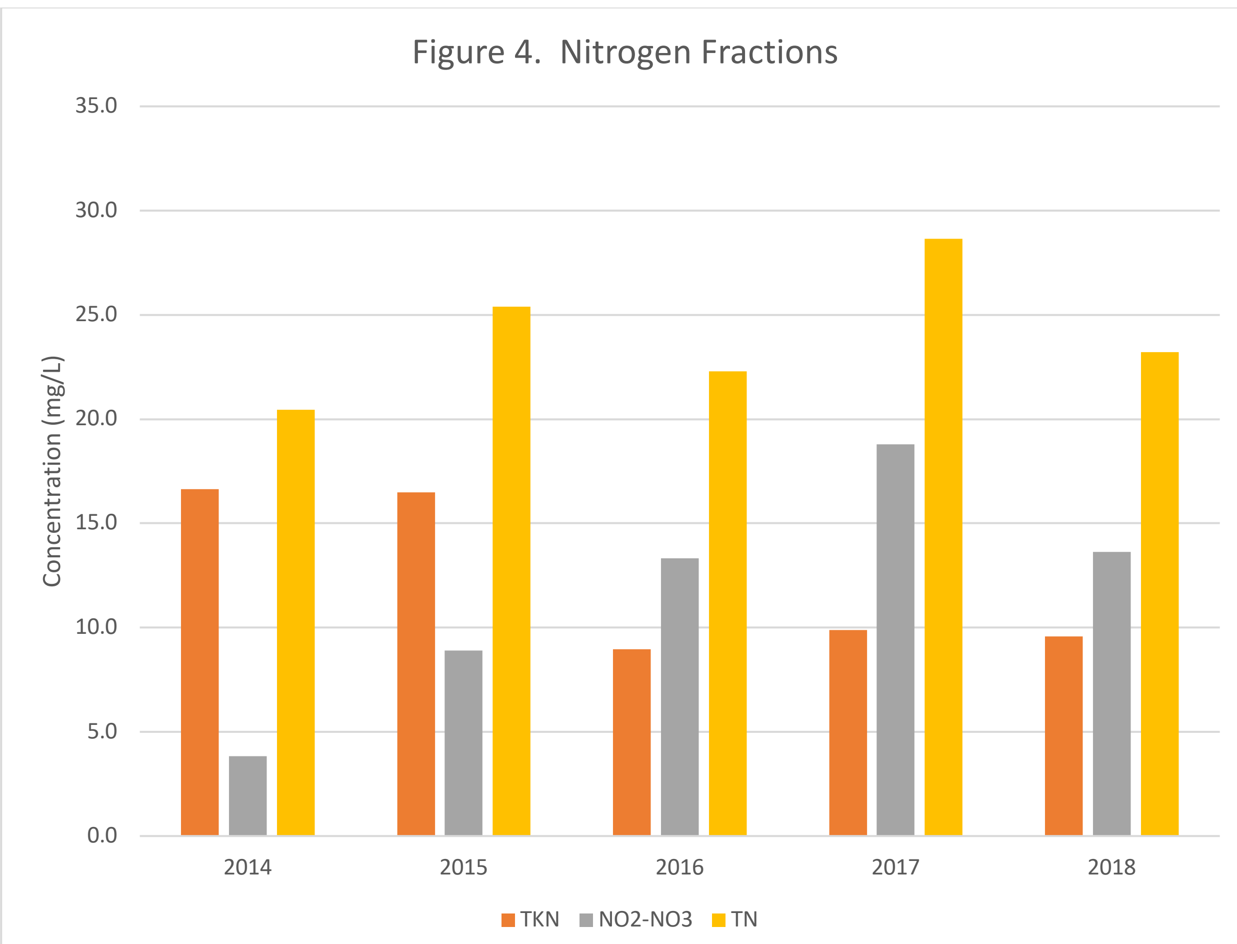
Reduction of ammonia and organic nitrogen could also reduce the effluent total nitrogen concentration. Ammonia concentrations are reduced through nitrification that converts ammonia to nitrate. In addition, some forms of organic nitrogen are converted to ammonia which is then nitrified. As presented above, the existing system is demonstrating nitrification through the removal of ammonia to and average concentration of less than 1 mg/L and the production of nitrate. More consistent nitrification of ammonia to concentrations less than 0.5 mg/L may be achievable, however, without the ability to denitrify, this would not result in a significant reduction of total nitrogen in the effluent. Additional reduction in organic nitrogen would also be difficult. Low effluent COD and BOD_5 concentrations indicate that even under long HRT conditions, the effluent organic fractions are not readily biodegradable. Removal of additional organics and organic nitrogen could likely be accomplished using chemical coagulation or other tertiary treatment processes. However, this cannot be accomplished with EXISTING equipment and would require significant capital investment.

Annual Nitrogen Discharge Load

Effluent nitrogen concentrations are measured infrequently based on permit requirements. Historically, these measurements have been made once per month. However, the current month requires monitoring twice per month. The reported concentrations for TKN, nitrite-nitrate, and TN are shown in Table 3 for the period of 2014 through 2018. Total nitrogen is assumed to be the sum of TKN and nitrite-nitrate concentrations. Concentrations are also shown in Figure 4. In 2016, an improvement in TKN removal was observed with concentrations being reduced from over 16 mg/L to below 10 mg/L. An increase in nitrate-nitrate concentrations was also observed, presumably due to an increase in nitrification. The average TN concentration for the 5-year period was 24 mg/L.

Table 3. Summary of Annual Average Nitrogen Concentrations

	Flow	**TKN**	**NO2-NO3**	**TN**	**TN Mass**
	Mgd	mg/L	mg/L	mg/L	lbs/day
2014	0.354	16.6	3.8	20.5	60.3
2015	0.405	16.5	8.9	25.4	85.7
2016	0.259	9.0	13.3	22.3	48.2
2017	0.224	9.9	18.8	28.6	53.5
2018	0.343	9.6	13.6	23.2	66.4
Average	0.317	12.3	11.7	24.0	62.8



To estimate the average daily nitrogen discharge loading, the average “monthly average flow” and the calculated average “monthly average total nitrogen” concentrations for each year were used to estimate the average daily loading. The results are shown in Table 3 and Figure 5. It is recognized that the accuracy of the estimate is limited due to infrequent monthly testing and the use of arithmetic average values for concentrations. The representativeness of nitrogen samples is also questionable since measurements were made only on operating days and as mentioned above, only one or two times per month. Weekend and other periods during which the manufacturing plant was not operating were not included in the nitrogen sampling data.

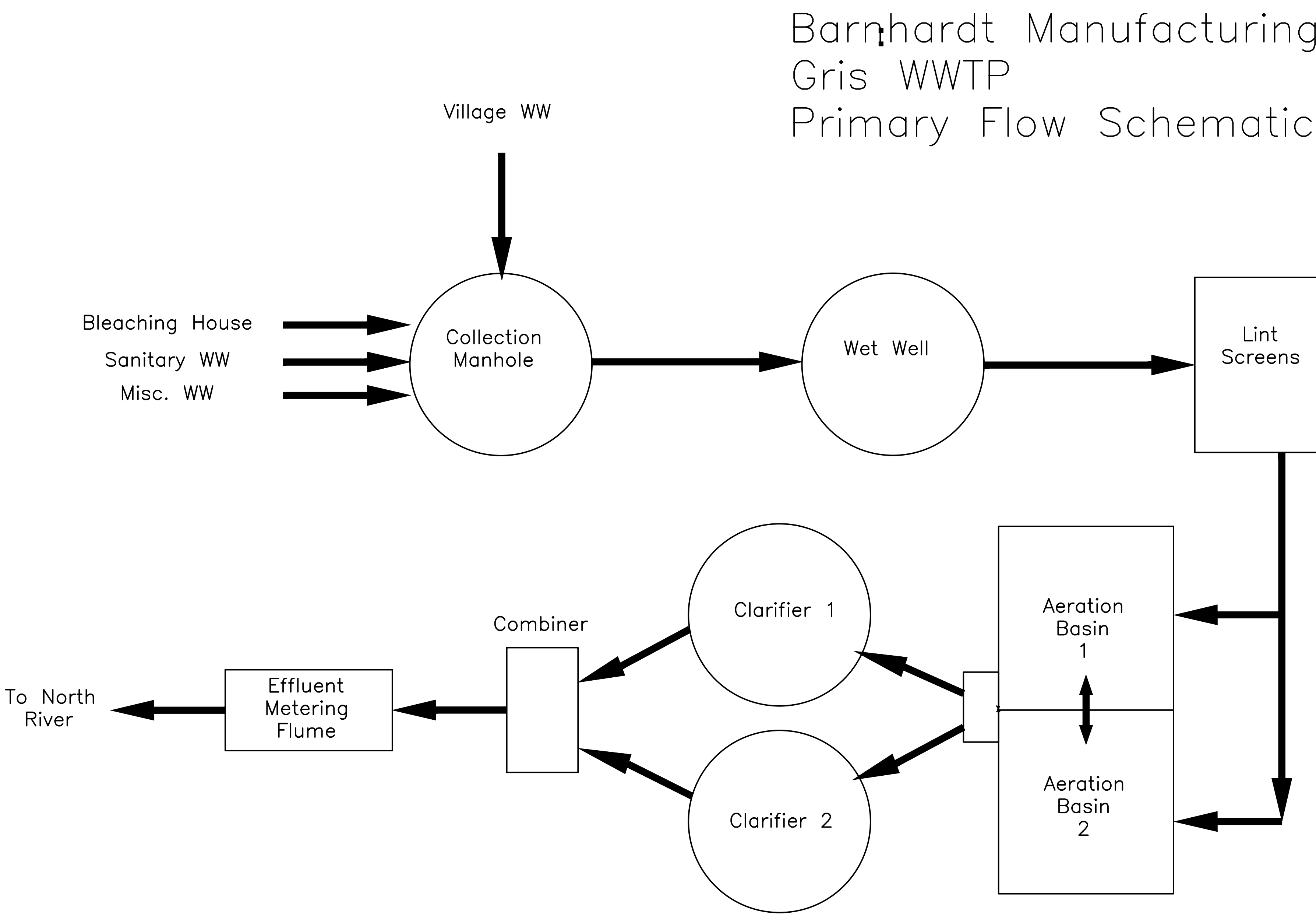
The total nitrogen loading for the 5-year period is estimated to have been 62.8 lbs/day. This is lower than the estimate of 67.3 lbs/day stated in the permit. Annual values range from 48.2 lbs/day in 2016 to 85.7 lbs/day in 2015. The total nitrogen mass loading variations are primarily caused by flow.

Conclusion

In conclusion, the existing wastewater treatment system is being operating efficiently and no operational changes that would significantly reduce the concentration of effluent total nitrogen were identified. Attempts to establish anoxic conditions within the existing treatment system without proper mixing and control may compromise the treatment system efficiency with respect to both carbonaceous material removal and nitrification. To provide additional total nitrogen removal, significant capital expenditures would be required for denitrification.

Under existing operating conditions, the total nitrogen discharge is primarily proportional to the flow. Thus, discharge nitrogen loadings will be directly impacted by changes in manufacturing production.

Appendix A: WWTP Flow Schematic



2018 ANNUAL COMPLIANCE REPORT

2018 NPDES Annual Compliance Report

Prepared for:

Barnhardt Manufacturing

NPDES Permit No. MA0003697

BARNHARDT

MANUFACTURING COMPANY

Prepared by:

Applied Technology and Engineering, P.C.

W. Gilbert O'Neal, Ph.D., P.E.

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2018 NPDES Annual Compliance Report

The Barnhardt Manufacturing NPDES Permit No. MA0003697 provides a three-year schedule for compliance with limits for phosphorus, copper, and toxicity. This report details progress toward meeting these limits for the calendar year 2018.

Phosphorus

Currently, Barnhardt is required to only report effluent total phosphorus concentrations. However, the seasonal limit of 1.26 mg/L for May through October will be in effect at the end of the compliance period.

Influent and effluent total phosphorus (TP) concentrations reported for 2018 are shown in Figure 1. Data used are shown in Appendix A. The average influent TP concentration was 4.75 mg/L and the average effluent concentration was 3.10 mg/L. Effluent TP and orthophosphate (PO_4) concentrations are shown in Figure 2. On average, the effluent PO_4 concentration was 81% of the TP.

During 2018, baseline data were collected for influent and effluent total phosphorus and orthophosphate. Given the high percentage of PO4, it is likely that phosphorus can be removed using inorganic coagulants such as alum.

Figure 1. Influent and Effluent Total Phosphorus Concentrations

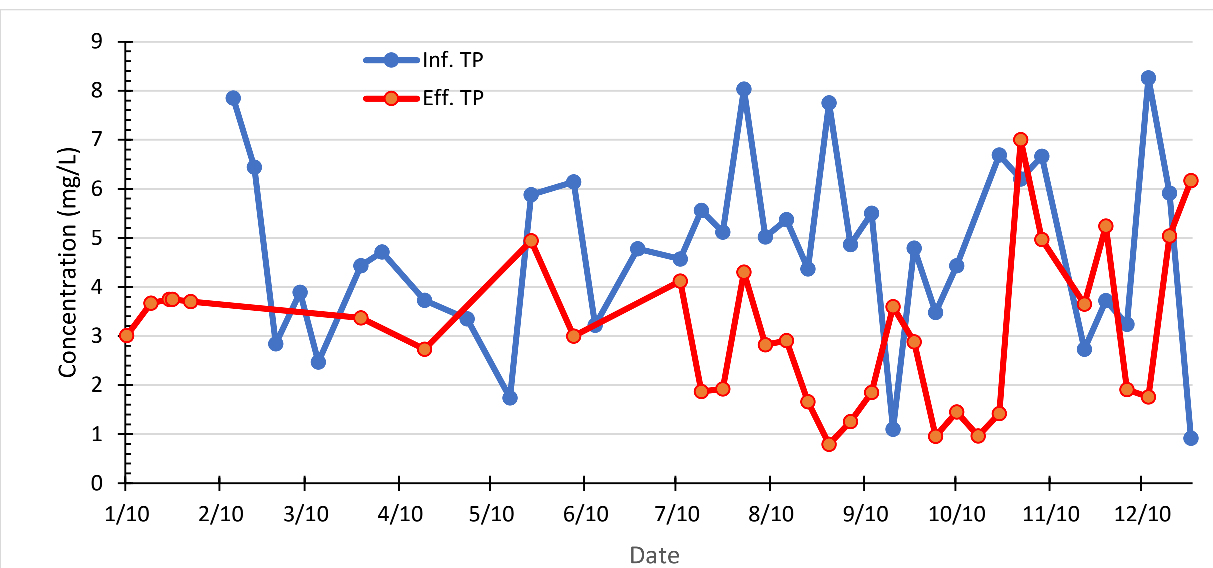
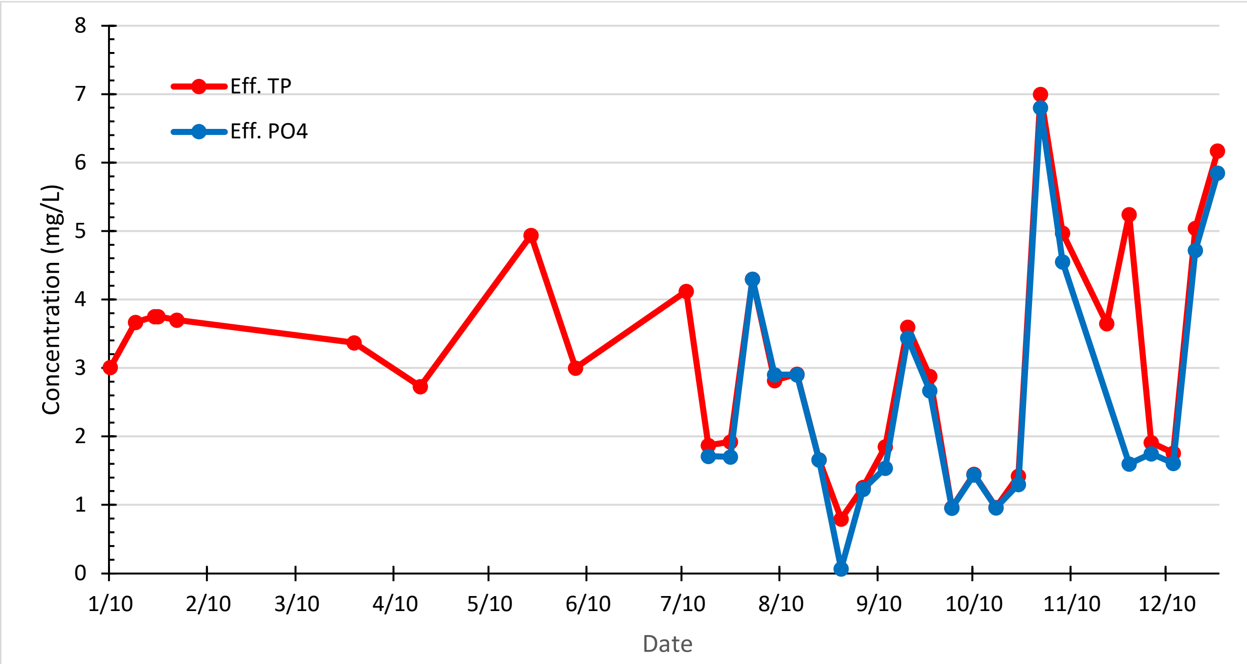


Figure 2. Effluent Total Phosphorus and Orthophosphate Concentrations

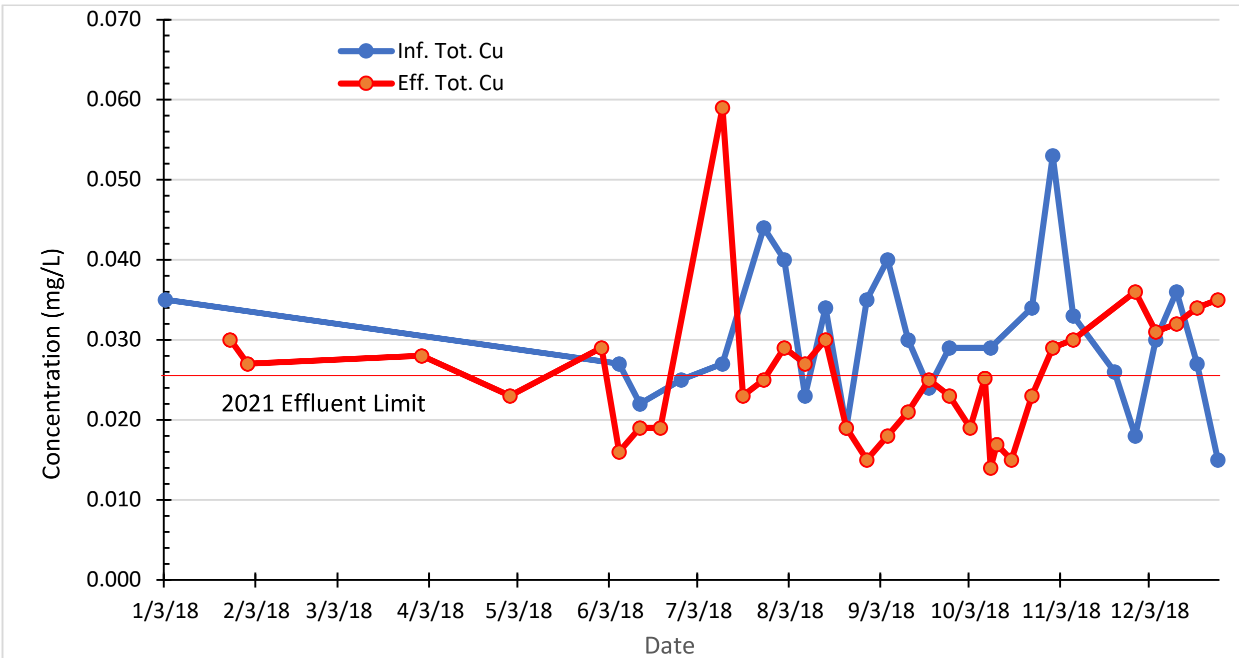


Copper

Currently, Barnhardt is required to only report effluent total copper (Cu) concentrations. However, the limit of 22 µg/L will be in effect at the end of the compliance period. Influent and effluent total copper concentrations are shown in Figure 3. These data were collected for monitoring purposes and are shown in Appendix B. The average influent Cu concentration was 31 µg/L and the average effluent concentration was 26 µg/L. The average effluent concentration exceeded the 2021 effluent limit.

In December 2018, the Quality Assurance Project Plan (QAPP) was submitted to MassDEP for conducting water quality monitoring to be used in a Biotic Ligand Model (BLM) to further assess the site-specific copper criteria used to establish the Barnhardt permit limit. Sampling was begun in May 2019.

Figure 3. Influent and Effluent Total Copper Concentrations



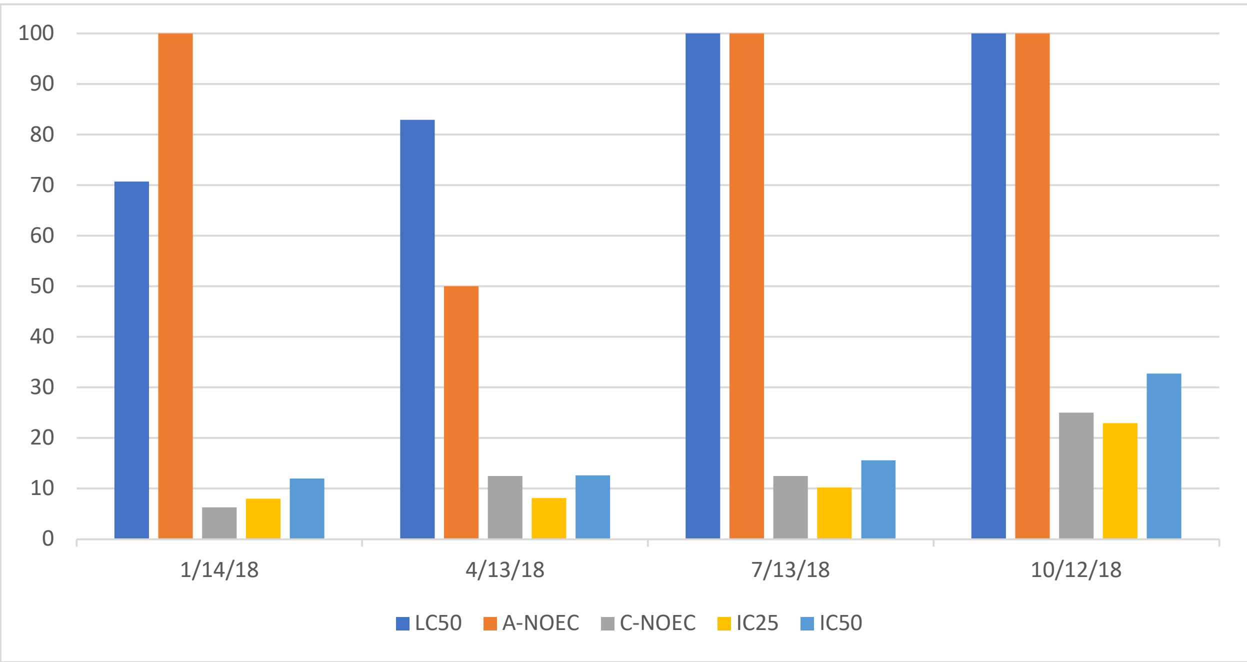
Toxicity

Currently, the permit limit for acute toxicity is an LC_{50} of >100%, and for chronic toxicity the limit is a No Observed Effect Concentration (C-NOEC) of >5%. At the end of the compliance period, the C-NOEC becomes more restrictive with a limit of >7.2%. The 2018 test results are shown in Table 1 and Figure 4.

Table 1. 2018 Toxicity Test Results

	LC50	A-NOEC	C-NOEC	IC25	IC50
Permit Limits:	>100%		>5%		
Date					
1/14/18	70.7	100	6.25	8	12
4/13/18	82.9	50	12.5	8.1	12.6
7/13/18	100	100	12.5	10.2	15.6
10/12/18	100	100	25	22.9	32.7

Figure 4. 2018 Toxicity Test Results



Acute toxicity levels exceeded (were more toxic) the permit limit during January and April quarters and, the chronic toxicity limit was not exceeded. IC_{25} values are consistent with the C-NOEC values. However, the 2021 pending chronic limit of 7.2% was exceeded for the January quarter.

Work will be done in 2019 to investigate the cause(s) of toxicity.

Conclusion

In conclusion, baseline data were collected during 2018. More detailed work will be done in 2019 to evaluate the steps necessary to be in compliance with 2021 pending limits for phosphorous, copper and toxicity.

Appendix A. 2019 Phosphorus Data

SampleDate	Inf. TP	Eff. TP	Inf. PO4	Eff. PO4
1/10/2018		3.01		
1/18/2018		3.67		
1/24/2018		3.75		
1/25/2018		3.75		
1/31/2018		3.7		
2/14/2018	7.85			
2/21/2018	6.44			
2/28/2018	2.84			
3/8/2018	3.89			
3/14/2018	2.47			
3/28/2018	4.43	3.37		
4/4/2018	4.71			
4/18/2018	3.73	2.73		
5/2/2018	3.35			
5/16/2018	1.74			
5/23/2018	5.88	4.94		
6/6/2018	6.14	3		
6/13/2018	3.22		1.98	
6/27/2018	4.78		3.01	
7/11/2018	4.57	4.12	3.01	
7/18/2018	5.56	1.87	3.94	1.71
7/25/2018	5.12	1.92	3.49	1.7
8/1/2018	8.03	4.3	5.75	4.3
8/8/2018	5.02	2.82	3.51	2.9
8/15/2018	5.37	2.91	3.37	2.9
8/22/2018	4.37	1.66	3.15	1.66
8/29/2018	7.75	0.796		0.0695
9/5/2018	4.86	1.26	2.7	1.23
9/12/2018	5.5	1.85	3.37	1.54
9/19/2018	1.1	3.6	0.489	3.44
9/26/2018	4.79	2.88	3.74	2.67
10/3/2018	3.48	0.959	2.14	0.956
10/10/2018	4.43	1.45	2.47	1.44
10/17/2018		0.962		0.96
10/24/2018	6.69	1.42	4.2	1.3
10/31/2018	6.2	7	3.96	6.8
11/7/2018	6.66	4.97	4.87	4.55

Sample Date	Inf. TP	Eff. TP	Inf. PO4	Eff. PO4
11/21/2018	2.73	3.65	1.23	
11/28/2018	3.72	5.24	2.34	1.6
12/5/2018	3.24	1.91	1.99	1.75
12/12/2018	8.26	1.76	5.7	1.61
12/19/2018	5.91	5.04	3.98	4.72
12/26/2018	0.918	6.17	0.526	5.85
Average	4.75	3.10	3.12	2.53
Max.	8.26	7.00	5.75	6.80
Min.	0.92	0.80	0.49	0.07
% of Total				81%

Appendix B. Influent and Effluent Copper Data

SampleDate	Inf. Tot. Cu	Eff. Tot. Cu	Eff. Sol. Cu
1/3/2018	0.035		
1/25/2018		0.03	
1/31/2018		0.027	
3/31/2018		0.028	
4/30/2018		0.023	
5/31/2018		0.029	
6/6/2018	0.027	0.016	
6/13/2018	0.022	0.019	
6/20/2018		0.019	0.019
6/27/2018	0.025		
7/11/2018	0.027	0.059	0.025
7/18/2018		0.023	0.022
7/25/2018	0.044	0.025	0.026
8/1/2018	0.04	0.029	
8/8/2018	0.023	0.027	
8/15/2018	0.034	0.03	
8/22/2018	0.019	0.019	
8/29/2018	0.035	0.015	
9/5/2018	0.04	0.018	
9/12/2018	0.03	0.021	
9/19/2018	0.024	0.025	
9/26/2018	0.029	0.023	
10/3/2018		0.019	
10/8/2018		0.0252	
10/10/2018	0.029	0.014	
10/12/2018		0.0169	
10/17/2018		0.015	
10/24/2018	0.034	0.023	
10/31/2018	0.053	0.029	
11/7/2018	0.033	0.030	
11/21/2018	0.026		
11/28/2018	0.018	0.036	
12/5/2018	0.03	0.031	
12/12/2018	0.036	0.032	
12/19/2018	0.027	0.034	
12/26/2018	0.015	0.035	

SampleDate	Inf. Tot. Cu	Eff. Tot. Cu	Eff. Sol. Cu
Average	0.030	0.026	0.023
Max.	0.053	0.059	0.026
Min.	0.015	0.014	0.019

REVISED DECEMBER 2018 DMR

NOTICE: This is an EXTERNAL email. Do not click links or attachments unless you recognize the sender and know the content is safe.

NetDMR has received the following 1 DMR(s) during the signing process.

CORs have been created for the following DMRs. These DMRs will be forwarded for further processing:

Permitted Facility Name: BARNHARDT MANUFACTURING CO
Permit ID: MA0003697
Permitted Feature: 001
Discharge: A - TREATED WASTEWATER OUTFALL 001
Monitoring Period End Date: 12/31/18
Signing Status: SIGNED SUCCESSFULLY
Comment:
Attachments included in the COR: Yes

Monthly_calculated_parameter_worksheet_July_2018.xls
December_1_2_2018.xls
2018_OEP_Letter.pdf
December_24_30_2018.pdf
December_17_23_2018.xls
December_10_16_2018.pdf
Gris_Production_12_2018.xlsx
December_3_9_2018.xls
2018_Revised_DMR_Nitrogen_Removal_Annual_Compliance_Report.pdf
December_31_2018.xls
Cover_Letter_12_18_Mthly.doc
NPDES_December_2018.pdf
NPDES_December_bi_monthly.pdf

Thank you.

For information on the CDX/NetDMR migration process for individuals with an existing NetDMR account please see the following link https://netdmr.zendesk.com/hc/en-us/articles/115002191163-NetDMR-to-CDX-Move-Walkthrough-Document. Individuals with migration issues should contact NPDESeReporting@epa.gov or 877-227-8965. Questions about CDX should be directed to the CDX Help Desk 888-890-1995. Question about NetDMR can be sent to EPA Region 1 at R1.NetDMR@epa.gov.

BARNHARDT
MANUFACTURING COMPANY
247 Main Road PO Box 3 • Colrain, MA 01340 • (413) 624-3471 • Fax (413) 624-5590

June 2, 2020

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square – Suite 100 (OEP06-03)
Boston, MA 02109-3912

Submitted Electronically to: R1NPDES.Notices.OEP@epa.gov

Re: **Revised 2019 Discharge Monitoring Report**
Barnhardt Manufacturing Co.
247 Main Road
Colrain, MA

To Whom it May Concern:

Barnhardt Manufacturing Company (BMC), is providing this cover letter in response to the United States Environmental Protection Agency's (USEPA) May 13, 2020 "Request for Information Pursuant to Section 308 of the Clean Water Act and Section 114(a)(1) of the Clean Air Act, EPA Docket No. CWA-308-R01-FY20-60."

USEPA's records indicate that BMC was not in compliance with the following reporting requirements under National Pollutant Discharge Elimination System (NPDES) Permit No. MA0003697 Parts I.B and I.C.:

- The December 2019 Discharge Monitoring Report (DMR) did not include the Nitrogen Removal Optimization Annual Report for 2019, due on January 15, 2020; and
- The December 2019 DMR did not include the Compliance Schedule Annual Report for 2019 due on January 15, 2020.

BMC has amended and submitted a revised December 2019 DMR to include the 2019 Nitrogen Removal Optimization report and 2019 Annual Compliance Report. A copy of the 2019 Annual Nitrogen Report, the 2019 Annual Compliance Report and revised December 2019 DMR are included as attachments to this letter and are hereby submitted to the EPA/OEP NPDES Applications Coordinator in the EPA Office Ecosystem Protection (OEP) in accordance with I.C.3 of the NPDES Permit.

All future reporting requirements shall be submitted using NetDMR and/or directly to the NPDES Applications Coordinator in accordance with the requirements set forth under the Permit.

If you have any questions or concerns, please don't hesitate to contact the undersigned.

Tim Mosher
Environmental, Health and Safety Manager
Barnhardt Manufacturing Company

Cc: Tom Robinson, Barnhardt Manufacturing Company, 1100 Hawthorne Ln, Charlotte, NC 28205

2019 ANNUAL NITROGEN REPORT

Applied Technology and Engineering, P.C.

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January 15, 2020

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

Ref: Gris WWTP Annual Nitrogen Report

Sent by Email: R1NPDESReports@epa.gov

To Whom it May Concern:

On behalf of Barnhardt Manufacturing Company, the following report is provided as required by NPDES Permit No. MA0003697 Part 1.B.2 to summarize activities related to optimizing the effectiveness of nitrogen removal methods, documentation of the annual nitrogen discharge load from the facility and a comparison of previous year loads.

The nitrogen removal optimization report required by the NPDES permit was submitted on February 28, 2019. The report concluded that the WWTP was being operated efficiently and in a manner that promoted nitrification. No operational changes that would improve nitrogen removal were identified. However, it was recognized that a large part of the total nitrogen being discharged was related to nitrites and nitrates (NOx) and that levels could be removed using anoxic denitrification. The report noted that this would require capital investments for mixing and control and would also require significant operational changes. No commitment was made to pursue this alternative.

The WWTP continues to be operated in a manner that will promote nitrification. Figure 1 shows concentrations for total nitrogen (TN), Total Kjeldahl Nitrogen (TKN) and NOx for 2019. Based on concentration values, NOx represented around 50% of the TN discharged. Figure 2 shows the effluent concentrations for ammonia (NH_3) and NOx. This demonstrates relatively low concentrations of NH_3 of in the effluent with high concentrations of NOx as a result of nitrification.

The TN effluent loadings for 2019 are shown in Figure 3. The average effluent TN loading for 2019 was 70.1 lbs/day.

A comparison of effluent TN loading is shown in Figure 4 for 2011 through 2019. Loadings for 2019 were higher than for 2018. It should be noted that effluent nitrogen concentrations were historically measured infrequently based on permit requirements. Prior to the current permit,

Figure 1. 2019 Effluent Concentrations for Total Nitrogen, Total Kjeldahl Nitrogen and Nitrite-Nitrate

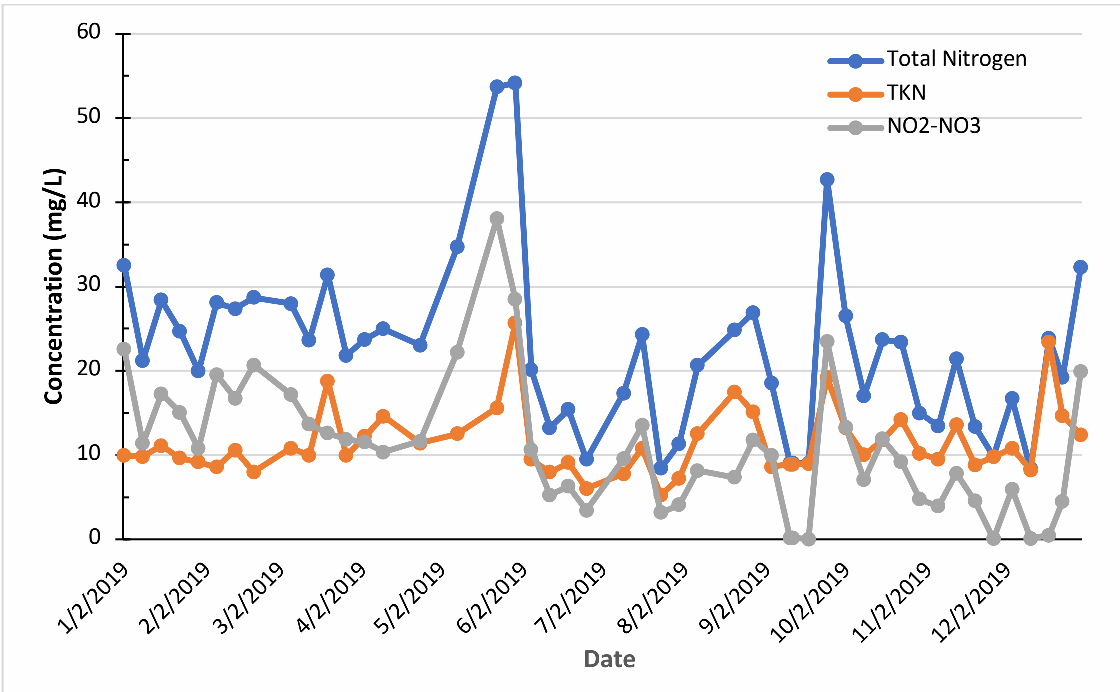


Figure 2. 2019 Effluent Concentrations for Ammonia and Nitrite-Nitrate

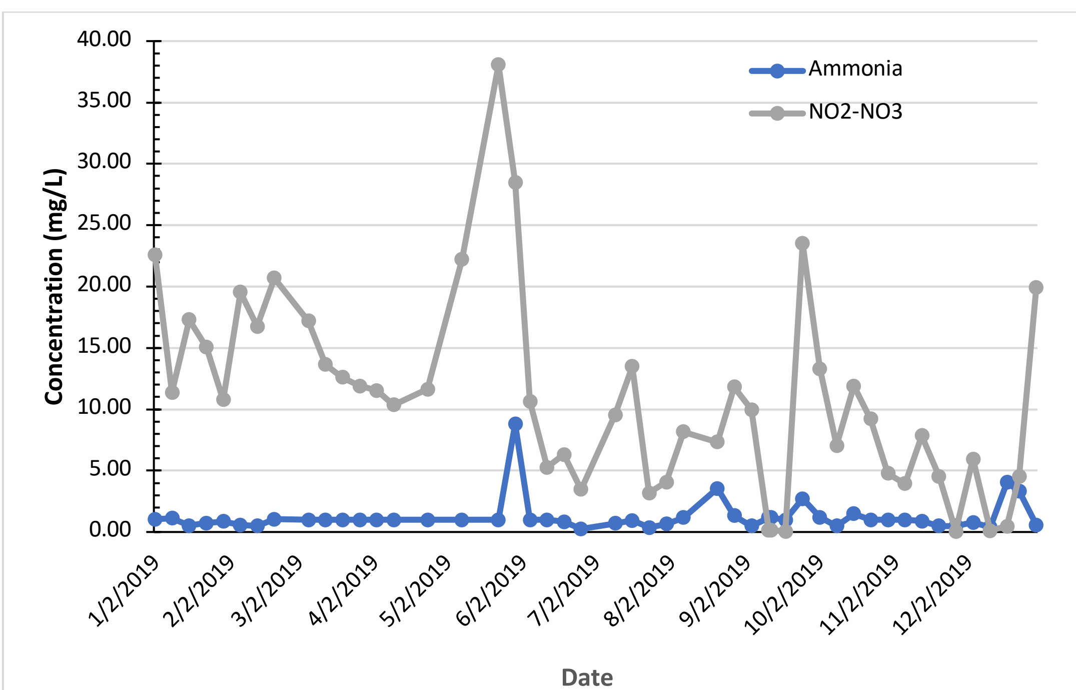


Figure 3. 2019 Effluent Total Nitrogen Loading

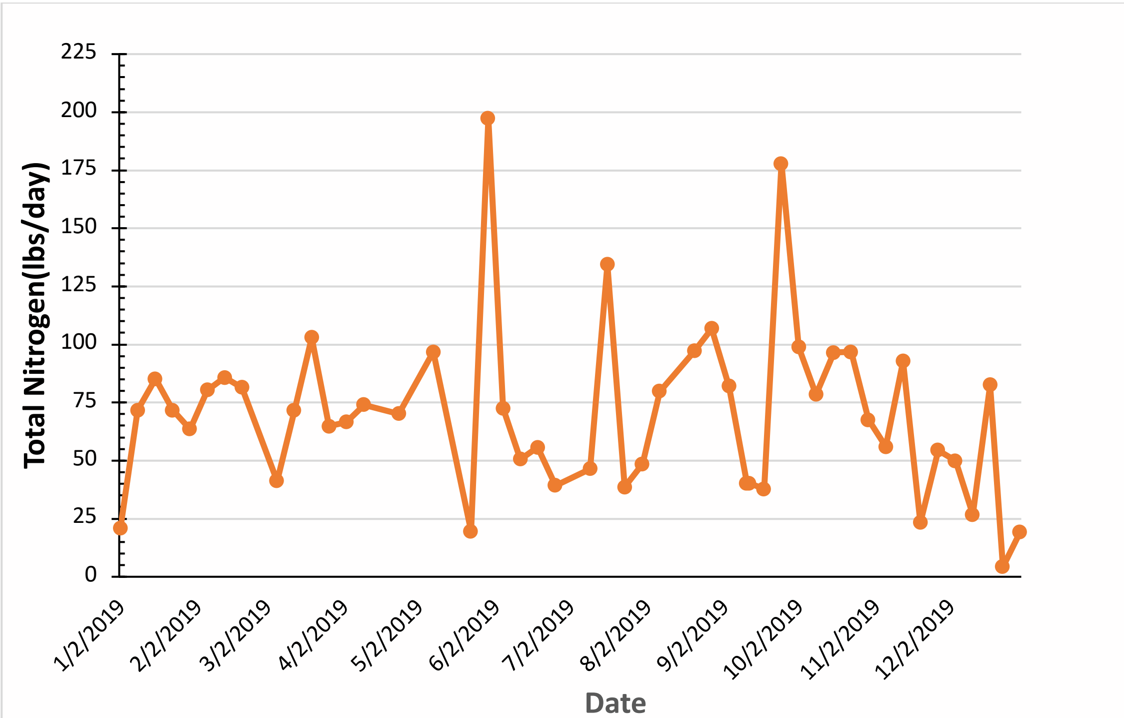
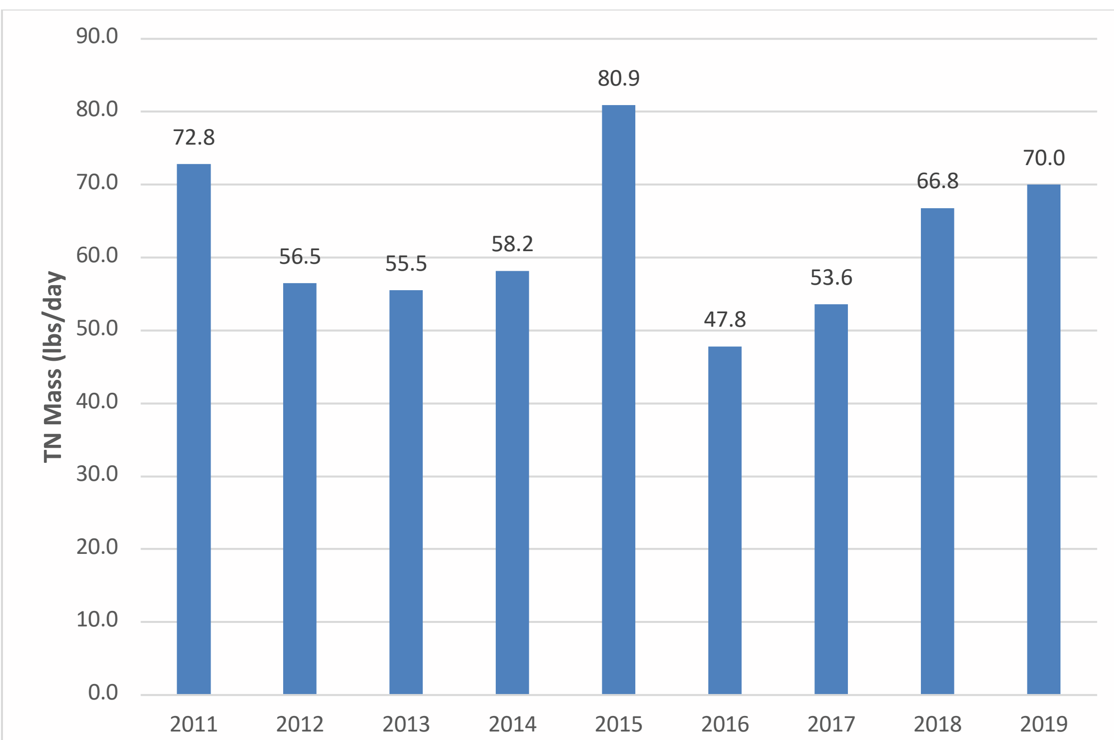


Figure 4. 2011 - 2019 Effluent Total Nitrogen Loading Comparison



nitrogen measurements were made once per month. However, the current permit requires monitoring twice per month for parameters related to TN. Given the variability of the flows and nitrogen concentrations, and the change in testing frequency, the results may not be representative for comparison across the data range presented.

Data used in this report are shown in Appendix A.

As indicated in the optimization report, the source of the nitrogen appears to be the raw cotton and is in the form of organic nitrogen. No chemicals used in processing that contain significant concentrations of nitrogen have been identified.

If you have any questions or need additional information, please feel to contact me or either Mr. Tom Robinson or Mr. Greg Morand at the numbers shown below.

Tom Robinson, Barnhardt Mfg., Phone: 704-376-0380

Greg Morand, Omni Environmental, Phone: 978-256-6766, Ext. 102

Sincerely,

W. Gilbert O'Neal

W. Gilbert O'Neal, Ph.D., P.E.
President

Cc: Greg Morand, Omni Environmental Group
Tom Robinson, Barnhardt Mfg.
Lewis Barnhardt, Barnhardt Mfg.
MASS-DEP Watershed Planning Program

Date	Flow	NO2	NO3	NO2-NO3	NH3	NH3	TKN	Org N	TN	TN
	mgd	mg/L	mg/L	mg/L	mg/L	lbs/day	mg/L	mg/L	mg/L	lbs/day
01/02/19	0.077	0.96	21.60	22.56	1.04	0.67	9.94	8.90	32.50	20.92
01/09/19	0.405	0.58	10.80	11.38	1.12	3.79	9.82	8.70	21.20	71.66
01/16/19	0.360	0.08	17.20	17.28	0.52	1.56	11.10	10.58	28.38	85.18
01/23/19	0.348	0.06	15.00	15.06	0.72	2.09	9.65	8.93	24.71	71.73
01/30/19	0.382	0.18	10.60	10.78	0.86	2.74	9.16	8.30	19.94	63.62
02/06/19	0.343	0.23	19.30	19.53	0.57	1.63	8.57	8.00	28.10	80.38
02/13/19	0.376	0.05	16.70	16.75	0.48	1.51	10.60	10.12	27.35	85.78
02/20/19	0.340	0.18	20.50	20.68	1.03	2.92	8.00	6.97	28.68	81.41
03/06/19	0.177	0.08	17.10	17.18	1.00	1.47	10.80	9.80	27.98	41.21
03/13/19	0.363	0.04	13.60	13.64	1.00	3.03	9.98	8.98	23.62	71.59
03/20/19	0.393	0.71	11.90	12.61	1.00	3.28	18.80	17.80	31.41	102.98
03/27/19	0.356	0.28	11.60	11.88	1.00	2.97	9.94	8.94	21.82	64.78
04/03/19	0.337	0.13	11.40	11.53	1.00	2.81	12.20	11.20	23.73	66.62
04/10/19	0.356	0.07	10.30	10.37	1.00	2.97	14.60	13.60	24.97	74.04
04/24/19	0.365	0.04	11.60	11.64	1.00	3.05	11.40	10.40	23.04	70.21
05/08/19	0.334	0.10	22.10	22.20	1.00	2.79	12.50	11.50	34.70	96.78
05/23/19	0.044	0.27	37.80	38.07	1.00	0.36	15.60	14.60	53.67	19.53
05/30/19	0.436	0.28	28.20	28.48	8.80	32.03	25.70	16.90	54.18	197.23
06/05/19	0.432	0.05	10.60	10.65	1.00	3.60	9.48	8.48	20.13	72.55
06/12/19	0.458	0.09	5.17	5.26	1.00	3.82	7.98	6.98	13.24	50.57
06/19/19	0.433	3.44	2.86	6.30	0.83	3.00	9.09	8.26	15.39	55.63
06/26/19	0.497	0.05	3.41	3.46	0.25	1.04	6.01	5.76	9.47	39.29
07/10/19	0.321	0.09	9.46	9.55	0.69	1.85	7.79	7.10	17.34	46.47
07/17/19	0.663	4.88	8.62	13.50	0.93	5.14	10.80	9.87	24.30	134.38
07/24/19	0.549	0.06	3.12	3.18	0.35	1.60	5.24	4.89	8.42	38.53

Date	Flow	NO2	NO3	NO2-NO3	NH3	NH3	TKN	Org N	TN	TN
	mgd	mg/L	mg/L	mg/L	mg/L	lbs/day	mg/L	mg/L	mg/L	lbs/day
07/31/19	0.513	0.10	3.98	4.08	0.65	2.78	7.25	6.60	11.33	48.51
08/07/19	0.463	0.93	7.23	8.16	1.17	4.52	12.50	11.33	20.66	79.81
08/21/19	0.469	0.44	6.90	7.34	3.54	13.85	17.50	13.96	24.84	97.16
08/28/19	0.476	0.82	11.00	11.82	1.32	5.24	15.10	13.78	26.92	106.83
09/04/19	0.530	0.14	9.83	9.97	0.49	2.17	8.59	8.10	18.56	82.06
09/11/19	0.532	0.02	0.14	0.16	1.17	5.19	8.92	7.75	9.08	40.27
09/12/19	0.532	0.02	0.14	0.16	1.17	5.19	8.92	7.75	9.08	40.27
09/18/19	0.502	0.01	0.03	0.04	1.00	4.19	8.98	7.98	9.02	37.81
09/25/19	0.500	19.90	3.60	23.50	2.72	11.33	19.20	16.48	42.70	177.89
10/02/19	0.447	0.80	12.50	13.30	1.21	4.51	13.20	11.99	26.50	98.89
10/09/19	0.552	0.25	6.79	7.04	0.50	2.30	10.00	9.50	17.04	78.50
10/16/19	0.488	2.88	9.02	11.90	1.49	6.07	11.80	10.31	23.70	96.49
10/23/19	0.496	2.06	7.15	9.21	1.00	4.13	14.20	13.20	23.41	96.75
10/30/19	0.541	0.45	4.32	4.77	1.00	4.51	10.20	9.20	14.97	67.52
11/06/19	0.500	0.49	3.44	3.93	1.00	4.17	9.48	8.48	13.41	55.93
11/13/19	0.518	3.61	4.25	7.86	0.89	3.85	13.60	12.71	21.46	92.71
11/20/19	0.208	1.89	2.66	4.55	0.50	0.87	8.83	8.33	13.38	23.23
11/27/19	0.665	0.02	0.03	0.05	0.50	2.77	9.77	9.27	9.82	54.47
12/04/19	0.357	4.24	1.71	5.95	0.77	2.29	10.80	10.03	16.75	49.89
12/11/19	0.385	0.06	0.05	0.11	0.39	1.25	8.21	7.82	8.32	26.72
12/18/19	0.415	0.40	0.08	0.48	4.04	13.98	23.40	19.36	23.88	82.60
12/23/19	0.026	3.88	0.63	4.51	3.33	0.73	14.70	11.37	19.21	4.24
12/30/19	0.071	17.20	2.72	19.92	0.58	0.34	12.40	11.82	32.32	19.21
Average	0.403	1.53	9.35	10.88	1.24	4.12	11.51	10.26	22.39	70.02
Max	0.665	19.90	37.80	38.07	8.80	32.03	25.70	19.36	54.18	197.23
Min	0.026	0.01	0.03	0.04	0.25	0.34	5.24	4.89	8.32	4.24

2019 ANNUAL COMPLIANCE REPORT

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January 15, 2020

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

Ref: Gris WWTP Annual Compliance Report

Sent by Email: R1NPDESReports@epa.gov

To Whom it May Concern:

On behalf of Barnhardt Manufacturing Company, the following report is provided as required by NPDES Permit No. MA0003697 Part 1.B.2 to detail progress towards meeting the final permit limits for phosphorus, copper, and toxicity. A three-year compliance schedule for these parameters was provided. Compliance with the limits for these parameters is required by February 28, 2021.

Phosphorus

Currently, Barnhardt is required to only report effluent total phosphorus concentrations. However, the seasonal limit of 1.26 mg/L for May through October will be in effect at the end of the compliance period.

Influent and effluent total phosphorus (TP) concentrations are shown in Figure 1. Data used are shown in Appendix A. The average influent TP concentration was 5.26 mg/L and the average effluent concentration was 3.15 mg/L. Effluent TP and orthophosphate (PO_4) concentrations are shown in Figure 2. It is observed that on average, 92% of the effluent TP is soluble PO_4. Since PO_4 is amenable to precipitation using aluminum salts, laboratory trials were conducted to determine phosphorus removal using alum, aluminum chlorohydrate (ACH), and polyaluminum chloride (PAC). The results are shown in Table 1 and Figure 3. Alum appeared to be the most effective. At a dosage of 200 mg/L, both TP and PO_4 were reduced well below the permit limit with values <0.1 and <0.023 mg/L, respectively.

In addition to treatment alternatives, work was done to identify chemicals used in manufacturing that contained phosphorus. The only chemical found to contain significant amounts of phosphorus was a boiler treatment chemical. This chemical was replaced in mid-August 2019.

Figure 1. Influent and Effluent Total Phosphorus Concentrations

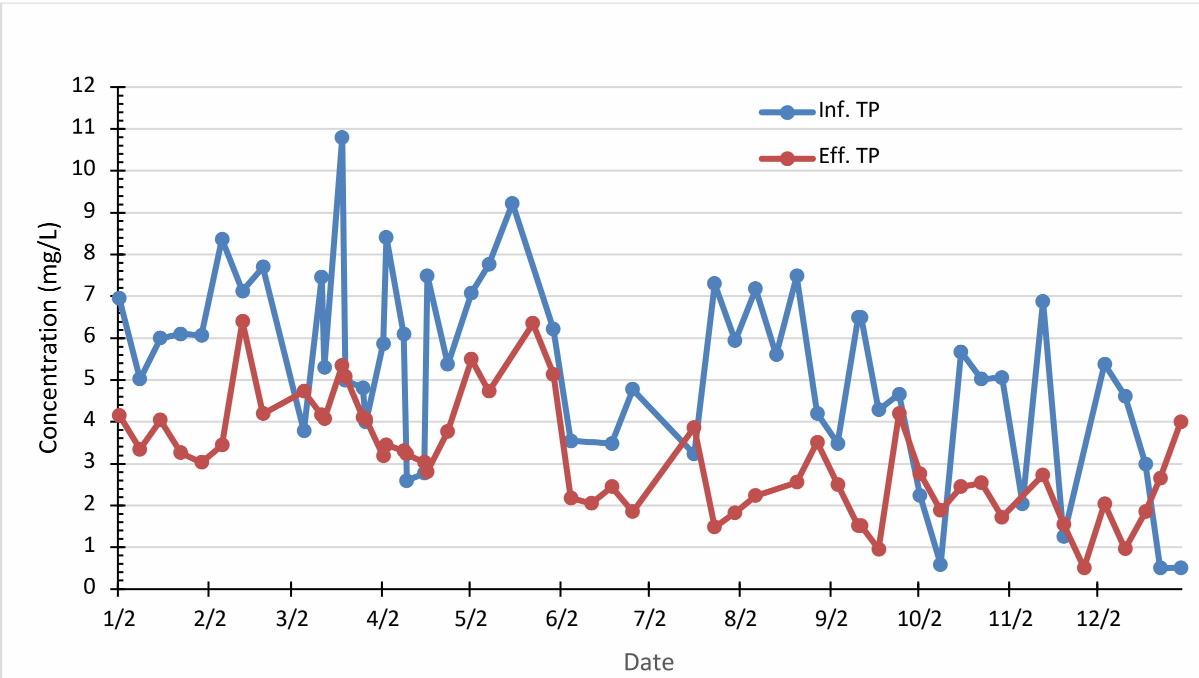


Figure 2. Effluent Total Phosphorus and Orthophosphate Concentrations

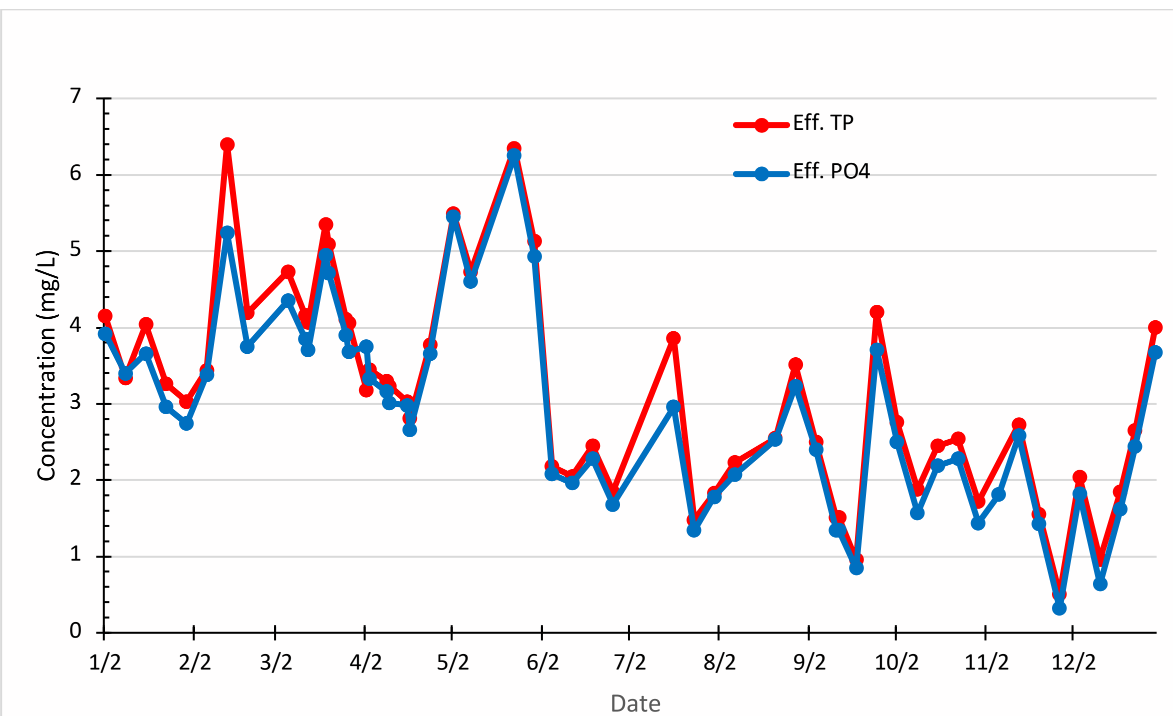


Figure 3. Results of Phosphorus Removal using Aluminum Salts

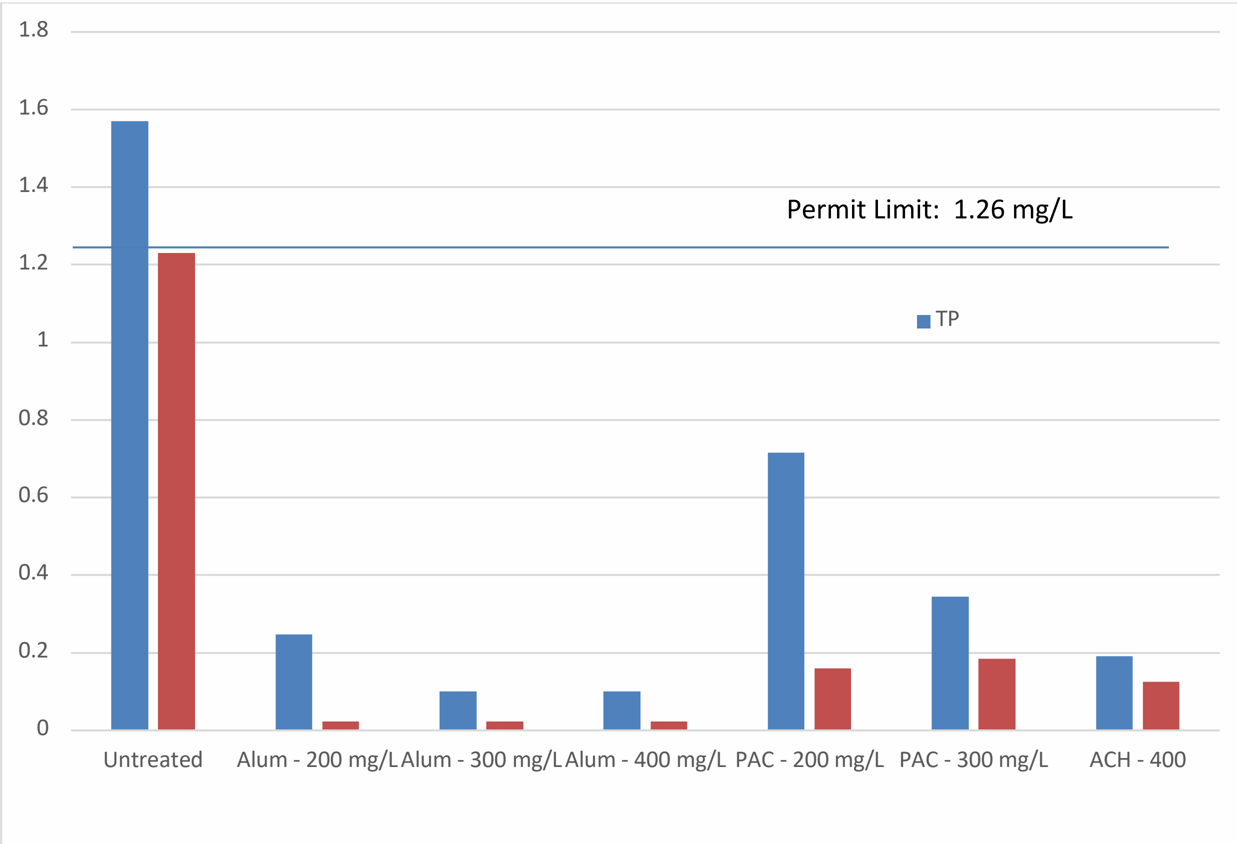


Table 1. Phosphorus Removal with Aluminum Salts

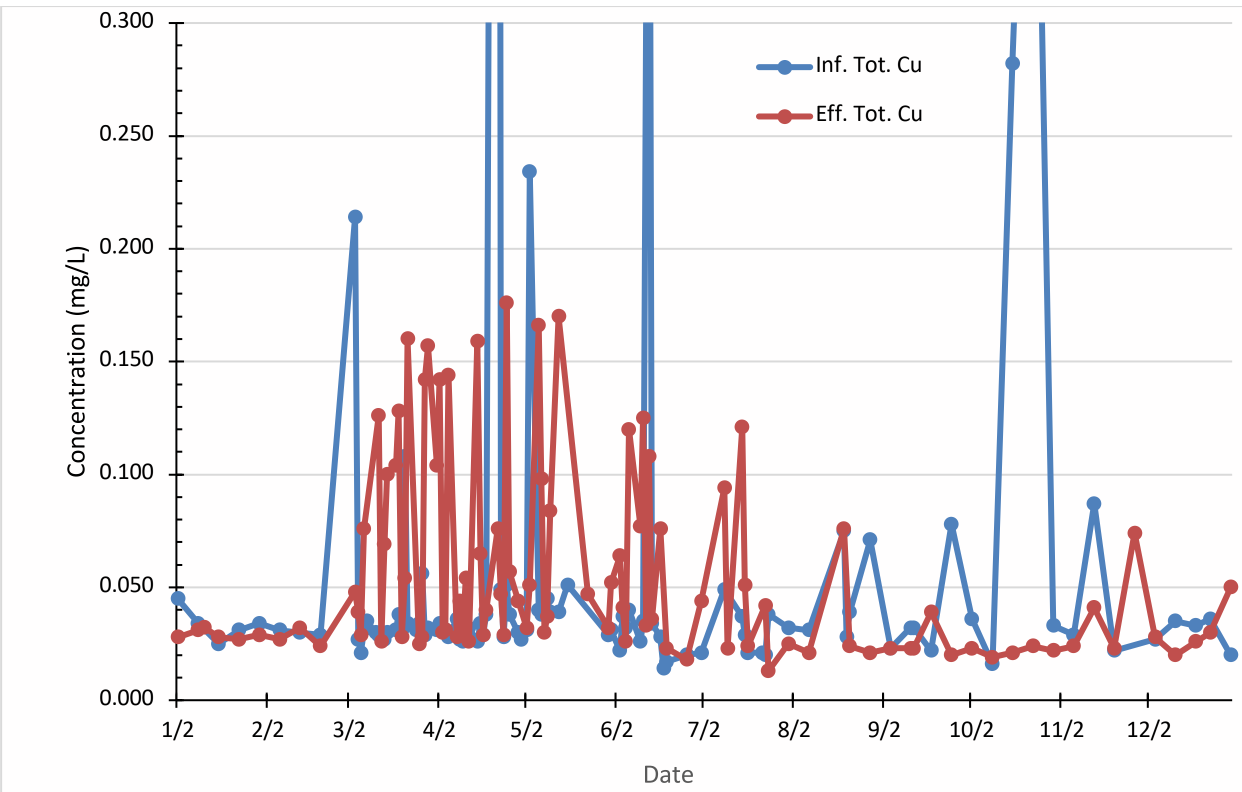
	TP	**PO_4**
Untreated	1.57	1.23
Alum - 200 mg/L	0.248	<0.023
Alum - 300 mg/L	<0.1	<0.023
Alum - 400 mg/L	<0.1	<0.023
PAC - 200 mg/L	0.715	0.16
PAC - 300 mg/L	0.345	0.184
ACH - 400	0.192	0.125

During 2020, additional work is planned to confirm these results and to evaluate removal at lower dosages. Work will also be done to determine the engineering requirements for implementation of chemical treatment for phosphorus reduction.

Copper

Currently, Barnhardt is required to only report effluent total copper (Cu) concentrations. However, the limit of 22 µg/L will be in effect at the end of the compliance period. Influent and effluent total copper concentrations are shown in Figure 4. This data was collected for monitoring purposes and are shown in Appendix B. The average influent Cu concentration was 63 µg/L and the average effluent concentration was 56 µg/L. Effluent concentrations were more stable at the end of 2019 with values often below 30 µg/L.

Figure 4. Influent and Effluent Total Copper Concentrations



Copper analyses were performed during the phosphorus removal chemical treatment trials noted above to determine if any insoluble forms of copper would be removed. However, no significant copper removal was observed.

In December 2018, the Quality Assurance Project Plan (QAPP) was submitted to MassDEP for conducting water quality monitoring to be used in a Biotic Ligand Model (BLM) to further assess the site-specific copper criteria used to establish the Barnhardt permit limit. Sampling was begun in May 2019. Results through December are shown in Appendix C. Testing is scheduled to be completed in the Spring of 2020. Based on the model results, the need for copper removal from the effluent will be further evaluated.

Additional testing is planned in 2020 to evaluate methods of effluent copper removal in the event that the BLM does not provide a site-specific limit that will not require further treatment. These efforts will include treatment and source reduction options.

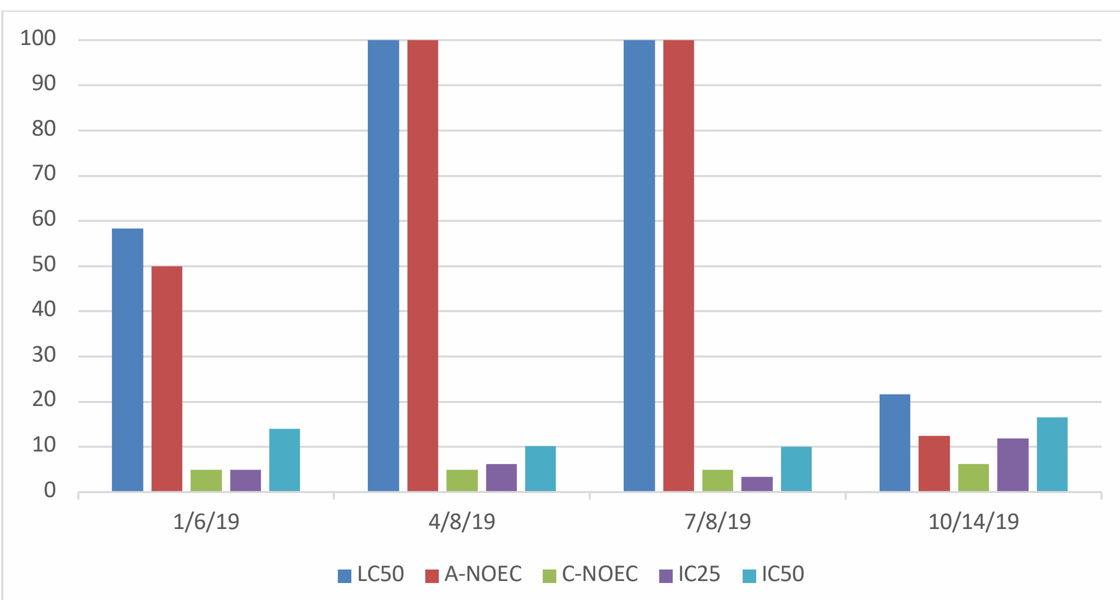
Toxicity

Currently, the permit limit for acute toxicity is an LC_{50} of >100% and for chronic toxicity the limit is a chronic No Observed Effect Concentration (C-NOEC) of >5%. At the end of the compliance period the C-NOEC becomes more restrictive with a limit of >7.2%. The 2019 test results are shown in Table 3 and Figure 5.

Table 3. 2019 Toxicity Test Results

	LC50	A-NOEC	C-NOEC	IC25	IC50
Permit Limits:	>100%		>5%		
Date					
1/6/19	58.3	50	<5	4.9	14
4/8/19	100	100	<5	6.2	10.2
7/8/19	100	100	<5	3.35	10
10/14/19	21.6	12.5	6.25	11.9	16.6

Figure 5. 2019 Toxicity Test Results



Note that the 5% LC_{50} values shown in Figure 5 actually represent values of <5% and were not in compliance with the current permit. Acute toxicity levels exceeded (were more toxic) the permit limit during January and October quarters while the chronic limit was exceed for January, April, and July quarters. IC_{25} values are consistent with the C-NOEC values. All of the chronic values exceeded the pending limit 7.2%.

In an effort to better understand the cause of toxicity, acute and chronic testing was performed on an effluent sample with the following additional treatment:

1. Activated carbon to remove dissolved organics;
2. Membrane filtration (0.045µm) to remove colloidal and suspended solids;
3. EDTA treatment to chelate copper and other metals; and
4. Chemical Coagulation using PAC.

Unfortunately, none of these treatments significantly improved the toxicity when compared to the untreated sample. There is concern that trace levels of herbicide or pesticides are present as contaminates on the cotton and are being removed during the scouring process. These compounds may be highly toxic and resistant to biodegradation or biodegrade into more toxic by-products.

Additional work is proposed to identify the cause of the toxicity or to identify treatment alternatives. Chemicals used in manufacturing have been evaluated and one of the scouring agents is being replaced due to its relatively high concentration of aromatic compounds. Toxicity testing is being considered for other manufacturing chemicals. Testing is also proposed to evaluate for the presence of trace levels of pesticides or herbicides that may be present on the raw cotton. In terms of treatment alternatives, additional testing is proposed to further evaluate the use of activated carbon, advanced oxidation and other treatments including those outlined in the EPA Aquatic Toxicity Identification Evaluation (TIE) protocols.[1,2,3]

Conclusion

In conclusion, work has been completed and is on-going to evaluate methods for compliance with the phosphorus, copper and toxicity limits. Compliance with the phosphorus limit appears to be achievable by precipitation with alum. In the event that the BLM does not justify higher site-specific limits for copper resulting in permit compliance, additional chemical treatment or source reduction may be needed for this parameter. Available methods are being evaluate. Toxicity reduction is the most challenging issue in that toxicity was not reduced using enhanced treatment such as activated carbon. In addition, the toxicity may be caused by trace levels of toxicants such as herbicides or biocides or oxidation by-products. TIE protocols are proposed to

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[1] USEPA (1991). Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures. EPA/600/6-91/003.
[2] USEPA (1993). Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA-600/R-92/080.
[3] USEPA (1993). Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity. EPA-600/R-92/081.

further evaluate toxicity. Work will continue into 2020 in an effort to be in compliance with the permit limits as required by the compliance schedule.

If you have any questions or need additional information, please feel to contact me or either Mr. Tom Robinson or Mr. Greg Morand at the numbers shown below.

Tom Robinson, Barnhardt Mfg., Phone: 704-376-0380

Greg Morand, Omni Environmental, Phone: 978-256-6766, Ext. 102

Sincerely,

W. Gilbert O'Neal

W. Gilbert O'Neal, Ph.D., P.E.
President

Cc: Greg Morand, Omni Environmental Group
Tom Robinson, Barnhardt Mfg.
Lewis Barnhardt, Barnhardt Mfg.
MASS-DEP Western Region, Bureau of Water Resources

Appendix A. 2019 Phosphorus Data

SampleDate	Inf. TP	Eff. TP	Inf. PO4	Eff. PO4
1/2/2019	6.95	4.15	2.12	3.92
1/9/2019	5.02	3.34	3	3.4
1/16/2019	6	4.04	3.68	3.66
1/23/2019	6.1	3.26	3.74	2.96
1/30/2019	6.07	3.03	3.56	2.74
2/6/2019	8.36	3.44	6.16	3.38
2/13/2019	7.12	6.4	4.28	5.24
2/20/2019	7.7	4.19	4.72	3.75
3/6/2019	3.78	4.73	2.24	4.35
3/12/2019	7.46	4.16	5.75	3.85
3/13/2019	5.3	4.07	3.51	3.71
3/19/2019	10.8	5.35	7.55	4.95
3/20/2019	4.99	5.09	2.97	4.71
3/26/2019	4.81	4.11	2.9	3.9
3/27/2019	3.99	4.06	2.24	3.68
4/2/2019	5.87	3.18	3.9	3.75
4/3/2019	8.41	3.45	5.85	3.33
4/9/2019	6.09	3.3	4.18	3.16
4/10/2019	2.59	3.23	1.4	3.01
4/16/2019	2.77	3.03	1.76	2.98
4/17/2019	7.49	2.81	5.95	2.66
4/24/2019	5.37	3.77	3.51	3.66
5/2/2019	7.08	5.49	4.85	5.45
5/8/2019	7.76	4.73	4.88	4.6
5/16/2019	9.22		6.45	
5/23/2019		6.35		6.25
5/30/2019	6.21	5.13	4.55	4.93
6/5/2019	3.54	2.18	2.02	2.08
6/12/2019		2.05		1.96
6/19/2019	3.48	2.45	2.52	2.28
6/26/2019	4.77	1.85	3.75	1.68
7/17/2019	3.23	3.86	1.67	2.96
7/24/2019	7.3	1.48	5.3	1.34
7/31/2019	5.94	1.83	4.27	1.78
8/7/2019	7.18	2.23	5	2.07

SampleDate	Inf. TP	Eff. TP	Inf. PO4	Eff. PO4
8/14/2019	5.6		3.79	
8/21/2019	7.48	2.55	5.3	2.53
8/28/2019	4.2	3.51	2.86	3.23
9/4/2019	3.48	2.5	1.75	2.4
9/11/2019	6.49	1.51	5.2	1.34
9/12/2019	6.49	1.51	5.2	1.34
9/18/2019	4.28	0.955	3.69	0.847
9/25/2019	4.66	4.2	3.28	3.71
10/2/2019	2.23	2.76	1.02	2.5
10/9/2019	0.586	1.88	0.211	1.57
10/16/2019	5.67	2.45	3.58	2.19
10/23/2019	5.02	2.54	3.42	2.28
10/30/2019	5.06	1.72	3.1	1.44
11/6/2019	2.04		1.27	1.81
11/13/2019	6.88	2.73	3.57	2.58
11/20/2019	1.25	1.55	0.585	1.43
11/27/2019		0.509		0.319
12/4/2019	5.38	2.04	3.92	1.82
12/11/2019	4.61	0.959	0.62	0.637
12/18/2019	2.99	1.85	1.74	1.62
12/23/2019	0.503	2.65	0.1	2.44
12/30/2019	0.511	4	0.284	3.67
Average	5.26	3.15	3.42	2.91
Max.	10.80	6.40	7.55	6.25
Min.	0.50	0.51	0.10	0.32

Appendix B. Influent and Effluent Copper Data

SampleDate	Inf. Tot. Cu	Eff. Tot. Cu	Eff. Sol. Cu
1/2/2019	0.045	0.028	
1/9/2019	0.034	0.031	
1/11/2019		0.0324	
1/16/2019	0.025	0.028	
1/23/2019	0.031	0.027	
1/30/2019	0.034	0.029	
2/6/2019	0.031	0.027	
2/13/2019	0.03	0.032	
2/20/2019	0.029	0.024	
3/4/2019	0.214	0.048	
3/5/2019	0.027	0.039	
3/6/2019	0.021	0.029	
3/7/2019	0.031	0.076	
3/8/2019	0.035		0.057
3/11/2019	0.03		0.164
3/12/2019	0.029	0.126	
3/13/2019	0.028	0.026	
3/14/2019	0.027	0.069	
3/15/2019	0.03	0.1	
3/18/2019	0.031	0.104	
3/19/2019	0.038	0.128	
3/20/2019	0.031	0.028	
3/21/2019	0.108	0.054	
3/22/2019	0.034	0.16	
3/25/2019	0.031		0.034
3/26/2019	0.034	0.025	
3/27/2019	0.056	0.028	
3/28/2019	0.029	0.142	
3/29/2019	0.032	0.157	
4/1/2019	0.031	0.104	
4/2/2019	0.034	0.142	
4/3/2019	0.032	0.03	
4/4/2019	0.031	0.031	
4/5/2019	0.028	0.144	
4/8/2019	0.036	0.028	
4/9/2019	0.027	0.044	

SampleDate	Inf. Tot. Cu	Eff. Tot. Cu	Eff. Sol. Cu
4/10/2019	0.026	0.029	0.027
4/11/2019	0.032	0.054	
4/12/2019	0.032	0.026	
4/15/2019	0.026	0.159	
4/16/2019	0.034	0.065	0.065
4/17/2019	0.029	0.029	
4/18/2019	0.038	0.04	
4/22/2019	1.36	0.076	
4/23/2019	0.049	0.047	
4/24/2019	0.028	0.029	
4/25/2019	0.051	0.176	
4/26/2019	0.038	0.057	
4/29/2019	0.03	0.044	
4/30/2019	0.027		0.146
5/2/2019	0.031	0.032	0.034
5/3/2019	0.234	0.051	
5/6/2019	0.04	0.166	
5/7/2019	0.038	0.098	
5/8/2019	0.038	0.03	
5/9/2019	0.045	0.037	
5/10/2019	0.039	0.084	
5/13/2019	0.039	0.17	
5/16/2019	0.051		
5/23/2019		0.047	
5/30/2019	0.029	0.032	
5/31/2019	0.031	0.052	
6/3/2019	0.022	0.064	
6/4/2019	0.037	0.041	
6/5/2019	0.032	0.026	
6/6/2019	0.04	0.12	
6/10/2019	0.026	0.077	
6/11/2019	0.035	0.125	
6/12/2019		0.033	0.032
6/13/2019	0.539	0.108	
6/14/2019	0.034	0.036	
6/17/2019	0.028	0.076	
6/18/2019	0.014		
6/19/2019	0.017	0.023	0.021

6/26/2019	0.02	0.018	0.016
7/1/2019	0.021	0.044	
7/9/2019	0.049	0.094	
7/10/2019		0.023	
7/15/2019	0.037	0.121	
7/16/2019	0.029	0.051	
7/17/2019	0.021	0.024	0.023
7/22/2019	0.021		0.058
7/23/2019	0.02	0.042	
7/24/2019	0.038	0.013	0.017
7/31/2019	0.032	0.025	
8/7/2019	0.031	0.021	
8/19/2019	0.075	0.076	
8/20/2019	0.028		0.124
8/21/2019	0.039	0.024	0.022
8/28/2019	0.071	0.021	
9/4/2019	0.023	0.023	
9/11/2019	0.032	0.023	
9/12/2019	0.032	0.023	
9/18/2019	0.022	0.039	0.034
9/25/2019	0.078	0.02	
10/2/2019	0.036	0.023	
10/9/2019	0.016	0.019	
10/16/2019	0.282	0.021	
10/23/2019	0.517	0.024	0.021
10/30/2019	0.033	0.022	0.022
11/6/2019	0.029	0.024	
11/13/2019	0.087	0.041	0.035
11/20/2019	0.022	0.023	0.019
11/27/2019		0.074	
12/4/2019	0.027	0.028	
12/11/2019	0.035	0.02	0.021
12/18/2019	0.033	0.026	0.027
12/23/2019	0.036	0.03	0.027
12/30/2019	0.02	0.05	0.046
Average	0.063	0.056	0.046
Max.	1.360	0.176	0.164
Min.	0.014	0.013	0.016

Appendix C. BLM Data

LABORATORY ANALYTICAL RESULTS (units in mg/L unless otherwise shown)										FIELD PARAMETERS			
Sample ID	Sample Date	Suspended Solids		Sulfate	Chloride	Total Alkalinity	Dissolved Organic Carbon	Turbidity (NTU)		Temperature (°C)	Specific Conductivity (µS/cm)	pH (Units)	Dissolved Oxygen (mg/L)
Upstream	5/8/2019	5	U	3.9	6.5	22	1.9	1	U	13.00	80	7.55	11.22
	6/19/2019	2	U	3.5	6.8	22	2.5	1	U	18.00	81	6.42	8.55
	7/22/2019	2	U	4.8	10	34	1.7	1	U	22.00	120	6.73	7.17
	8/14/2019	2	U	4.8	10	35	1.8	1	U	21.00	120	6.95	7.65
	9/17/2019	2	U	4.9	11	37	1.8	1	U	15.00	120	6.95	8.49
	10/8/2019	2	U	4.9	10	34	1.9	1	U	14.00	120	7.11	8.40
	11/5/2019	2	U	4.2	7.3	21	3.3	1	U	9.00	80	6.42	NA
	12/19/2019	2.4		4.4	6.9	17	2.1	1		1.00	83	7.56	14.86
Downstream	5/8/2019	5	U	4.4	6.7	31	2.5	1	U	16.00	100	7.60	8.66
	6/19/2019	2	U	5.0	6.9	28	2.9	1	U	19.00	100	6.81	7.87
	7/22/2019	2	U	8.1	11	89	4.7	1	U	22.00	240	7.55	7.65
	8/14/2019	2	U	8.1	11	92	5.9	1	U	22.00	240	7.90	8.54
	9/17/2019	2	U	12	11	68	3.8	1	U	17.00	200	7.88	8.63
	10/8/2019	3		7.6	11	60	3.8	1.3		14.00	180	7.57	8.46
	11/5/2019	2	U	5.0	7.7	34	4.3	1	U	9.00	110	6.57	NA
	12/19/2019	2	U	5.3	7.0	25	2.6	2		1.00	100	7.24	14.70
Effluent	5/8/2019	12		99	14	1,500	110	1		23.00	3,100	8.66	NM
	6/20/2019	2.8		220	2.9	1,000	69	1.3		18.00	2,400	8.45	6.57
	7/23/2019	4.6		53	14	830	53	1.3		11.00	1,700	8.35	9.26
	8/15/2019	5.4		77	22	1,200	90	1.8		11.00	2,500	8.73	8.10
	9/18/2019	11		230	21	970	61	3		11.00	2,300	8.60	4.88
	10/9/2019	23		110	23	1,100	71	7.4		7.00	2,400	8.65	8.82
	11/6/2019	24		7.0	1.6	1,000	75	7		4.00	2,200	8.75	NA
	12/19/2019	28		130	17	1,100	97	10		3.00	2,600	8.54	
Duplicate	5/8/2019	5	U	4.5	6.6	31	2.5	1	U	NA	NA	NA	NA
	6/19/2019	2	U	4.9	7.0	29	3.0	1	U	NA	NA	NA	NA
	7/22/2019	2	U	8.2	11	89	4.6	1	U	NA	NA	NA	NA
	8/14/2019	2.2		8.1	11	93	6.0	1	U	NA	NA	NA	NA
	9/17/2019	2	U	12	11	68	3.7	1	U	NA	NA	NA	NA
	10/8/2019	2.2		7.7	11	59	3.8	1.2		NA	NA	NA	NA
	11/5/219	2	U	5.1	7.7	34	4.1	1	U	NA	NA	NA	NA
	12/19/2019	2	U	5.3	7.0	26	2.6	2		NA	NA	NA	NA

NOTES:

NTU = Nephelometric Turbidity Units

mg/L = Milligrams per liter

U = Not detected by laboratory in concentration at or above reporting limit that is presented in previous column

(µS/cm) - Micro Siemens per centimeter

(mV) - Millivolts

NA - Not Applicable

NM - Not Measured

LABORATORY ANALYTICAL RESULTS (mg/L)								
Sample ID	Sample Date	Calcium	Dissolved Copper	Total Copper	Magnesium	Potassium	Sodium	Total Hardness
Upstream	5/8/2019	9.1	0.0007	0.0005	0.98	1.0	5.0	27
	6/19/2019	8.5	0.0009	0.0008	1.3	0.96	5.4	27
	7/22/2019	14	0.0010	0.0008	1.5	1.7	7.3	40
	8/14/2019	13	0.00074	0.00068	1.5	1.6	7.4	39
	9/17/2019	13	0.0007	0.00065	1.6	1.6	7.9	40
	10/8/2019	13	0.00055	0.00063	1.5	1.7	7.1	39
	11/5/219	8.3	0.00067	0.00085	1.1	1.3	5.3	26
	12/19/2019	8.5	0.00069	0.00084	1.0	1.0	4.7	25
Downstream	5/8/2019	9.2	0.0021	0.0007	1.0	1.6	11	27
	6/19/2019	8.6	0.0009	0.0009	1.3	1.3	8.6	27
	7/22/2019	14	0.0017	0.0016	1.7	4.0	36	41
	8/14/2019	13	0.0021	0.0017	1.7	4.3	36	40
	9/17/2019	14	0.0014	0.0014	1.8	3.6	30	43
	10/8/2019	14	0.0023	0.0011	1.7	2.9	21	41
	11/5/219	8.6	0.0011	0.0012	1.2	2.0	11	26
	12/19/2019	8.9	0.00097	0.00086	1.0	1.3	8.1	26
Effluent	5/9/2019	20	0.022	0.022	8.8	82	780	87
	6/20/2019	14	0.016	0.016	5.9	47	510	59
	7/23/2019	17	0.011	0.013	5.1	37	400	64
	8/15/2019	19	0.016	0.018	7.5	62	600	79
	9/18/2019	19	0.014	0.015	7.1	54	570	76
	10/9/2019	12	0.015	0.018	7.2	58	570	59
	11/6/2019	14	0.016	0.019	7.2	66	530	65
	12/19/2019	6.7	0.019	0.019	7.6	74	590	48
Duplicate	5/8/2019	9.0	0.0015	0.0007	1.0	1.6	10	27
	6/19/2019	8.6	0.0009	0.0009	1.3	1.2	8.6	27
	7/22/2019	14	0.0016	0.0017	1.7	3.9	36	41
	8/14/2019	13	0.0017	0.0018	1.7	4.5	37	40
	9/17/2019	14	0.0014	0.0017	1.8	3.6	30	43
	10/8/2019	14	0.0014	0.0013	1.8	2.9	21	43
	11/5/219	8.4	0.00097	0.00090	1.2	2.0	11	26
	12/19/2019	8.8	0.00010	0.00013	1.1	1.4	8.2	26

NOTES:
mg/L = Milligrams per liter
U = Not detected by laboratory in concentration at or above reporting limit that is presented in previous column

REVISED DECEMBER 2019 DMR

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NetDMR has received the following 1 DMR(s) during the signing process.

CORs have been created for the following DMRs. These DMRs will be forwarded for further processing:

Permitted Facility Name: BARNHARDT MANUFACTURING CO
Permit ID: MA0003697
Permitted Feature: 001
Discharge: A - TREATED WASTEWATER OUTFALL 001
Monitoring Period End Date: 12/31/19
Signing Status: SIGNED SUCCESSFULLY
Comment:
Attachments included in the COR: Yes

Grs_Production_dec2019.pdf
Cover_Letter_December_Mthly_2019.doc
2019_OEP_Letter.pdf
December_23_29_2019.pdf
bi_monthly_npdes.pdf
2019_Revised_DMR_Nitrogen_Removal_Annual_Compliance_Report.pdf
December_9_15_2019.pdf
December_1_2019.pdf
Monthly_calculated_parameter_worksheet_december_2019.xlsx
december_NPDES.pdf
December_2_8_2019.pdf
December_16_22_2019.pdf
December_30_31_2019.pdf

Thank you.

For information on the CDX/NetDMR migration process for individuals with an existing NetDMR account please see the following link https://netdmr.zendesk.com/hc/en-us/articles/115002191163-NetDMR-to-CDX-Move-Walkthrough-Document. Individuals with migration issues should contact NPDESeReporting@epa.gov or 877-227-8965. Questions about CDX should be directed to the CDX Help Desk 888-890-1995. Question about NetDMR can be sent to EPA Region 1 at R1.NetDMR@epa.gov.